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Antitrust as Consumer Protection in the New Economy: Lessons from the Microsoft Case

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Table of Contents

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I. A Rule of Reason Requires Reasonable Rules

A. New Economic Theory v. Classic Antitrust Abuse

The Consumer Federation of America is procompetitive when it comes to market structure and generally argues for a rule of reason based on fundamentals of economic cost-benefits analysis.[1] However, good consumer economic analysis demands that the rule of reason be based on reasonable rules. The analytic framework must be able to comprehend basic empirical facts in a manner that coherently and realistically integrates economic structure, conduct, and performance. There should be no presumptions in favor of, or against business. The discount rate should reflect the real rate of interest that consumers can earn. The value of a person's time and risk of harm should reflect the economic and intrinsic value of life. The Microsoft case rewards this pragmatic approach to policy analysis handsomely.

At the outset of the trial in *United States v. Microsoft*,[2] few would have predicted the dramatic finding against Microsoft. Many who viewed Microsoft as a dynamic, new economy business had difficulty believing Microsoft had used plain old anti-competitive dirty tricks to achieve its business success and were shocked when the court concluded:

> [O]nly when the separate categories of conduct are viewed, as they should be, as a single, well-coordinated course of action does the full extent of the violence that Microsoft has done to the competitive process reveal itself. In essence, Microsoft mounted a deliberate assault upon entrepreneurial efforts that, left to rise or fall on their own merits, could well have enabled the introduction of competition into the market for Intel-compatible PC operating systems. While the evidence does not prove that they would have

1. In particular, the Consumer Federation of America has applied a similar analysis to a variety of other "network" industries. *See, e.g.*, CONSUMER FEDERATION OF AMERICA AND THE MEDIA ACCESS PROJECT, THE CONSUMER CASE AGAINST MICROSOFT (Oct. 1, 1998) http://www.consumerfed.org/publist.html; CONSUMER FEDERATION OF AMERICA AND CONSUMERS UNION, RESIDENTIAL CONSUMER ECONOMICS OF ELECTRIC UTILITY RESTRUCTURING (July 1998) http://www.consumerfed.org/publist.html; CONSUMER FEDERATION OF AMERICA AND CONSUMERS UNION, ELECTRICITY RESTRUCTURING AND THE PRICE SPIKES OF 1998 (June 21, 1999) http://www.consumerfed.org/publist.html; CONSUMER FEDERATION OF AMERICA, CONSUMER GROUPS UNITE TO OPPOSE THE SBC-AMERITECH MERGER (Jan. 20, 1999) http://www.consumerfed.org/publist.html; CONSUMER FEDERATION OF AMERICA, BREAKING THE RULES: AT&T'S ATTEMPT TO BUY A NATIONAL MONOPOLY IN CABLE TV AND BROADBAND INTERNET SERVICES (Sept. 19, 1999) http://www.consumerfed.org/publist.html.

2. United States v. Microsoft Corp., 84 F. Supp. 2d 9 (D.D.C. 1999).

> succeeded absent Microsoft's actions, it does reveal that Microsoft placed an oppressive thumb on the scale of competitive fortune, thereby effectively guaranteeing its continued dominance in the relevant market. More broadly, Microsoft's anti-competitive actions trammeled the competitive process through which the computer software industry generally stimulates innovation and conduces to the optimum benefit of consumers.[3]

Contrary to the claims of a recent headline in the *New York Times* Book Review, Microsoft did not lose this case "by defending too much too often."[4] It did not lose because of a remarkably inept defense,[5] or because of allegations that crucial pieces of evidence were rigged,[6] or because of an irrational or biased judge.[7] It lost because its acts were simply indefensible. The intent and effect of its behavior was so blatantly anti-competitive and the economic assumptions necessary to excuse it so narrow and unrealistic, that not even a conservative judge—Ronald Reagan's first judicial appointee[8]—could do anything but find Microsoft guilty by a reasonable interpretation of the antitrust rules (see Exhibit I-1). In fact, numerous conservative antitrust thinkers have recognized that a knee jerk defense of Microsoft is wrong, because it risks destroying all

3. United States v. Microsoft Corp., 87 F. Supp. 2d 30, 44 (D.D.C. 2000) (citations omitted).

4. Adam Liptak, *Microsoft Lost Its Antitrust Case by Defending Too Much Too Often*, NY TIMES ON THE WEB, Feb. 4, 2001, *at* http://www.nytimes.com.

5. *See* Rajiv Chandrasekaran, *U.S., 19 States Discuss Possible Sanctions Plan for Microsoft*, WASH. POST, Feb. 15, 1999, at A1 (using the word "stumbling" to describe the presentation of Microsoft's defense); *see also* James V. Grimaldi, *Some Observers Say Microsoft Has Blown Its Case with Blunders*, SEATTLE TIMES, Feb. 9, 1999, *available at* http://archives.seattletimes.nwsource.com.

6. The most striking example of tainted evidence was the presentation of a videotape which purported to show that the browser could not be removed without impairing the function of the operating system. The witness presenting the video could not account for discontinuities on the tape. JOHN HEILEMANN, PRIDE BEFORE THE FALL 181-86 (2001). Microsoft never did sort out what had occurred, so it is unclear whether this was an honest mistake or deception. Another incident, having to do with a survey that Microsoft had commissioned to support its case, presented the court with a direct effort to mislead. Microsoft appears to have developed a survey of browser users which was purposefully intended to provide an after the fact defense of its behavior. *Microsoft Rigged Survey?*, CNNFN, (Jan. 14, 1999), *at* http://cnnfn.cnn.com/1999/01/14/technology/microsoft/. When one of Microsoft's outside witnesses relied on this data in court, rather than the actual data on which Microsoft's executives relied, the Judge was quite blunt in his rebuke. *See Microsoft*, 84 F. Supp. 2d at 101.

7. Interviews granted during the trial and public statements since have resulted in the appeals court asking parties to comment on the judge's behavior.

8. KEN AULETTA, WORLD WAR 3.0, at 42 (2001).

reasonable rules of a productively competitive marketplace,[9] and warned allowing such behavior will undermine the fundamental competitive dynamic that drives progress in our capitalist economy.[10]

Microsoft attacked the fundamentals of antitrust, hiring the Dean of the Massachusetts Institute of Technology business school and a bevy of consultants[11] to present a theory that asked the court to abandon its traditional view of competition and accept the proposition that markets will inevitably be dominated by very few, very large companies. They claimed that competition does not take place within markets; the struggle is for the entire market. Market domination is benign because firms enjoy the benefits of network effects and virtuous circles of increasing productivity, while the fear of being replaced as the industry leader drives even the dominant firm to innovate and treat consumers just as well as traditional competition for market share in old economy industries.[12] Consequently, Microsoft did not violate the antitrust laws, it was simply the winner-take-all nature of the industry that made it act this way and gave it market dominance. By this definition virtually no act could violate the antitrust laws in this industry.[13]

9. Robert Bork, *The Most Misunderstood Antitrust Case*, WALL ST. J., May 22, 1998, at A16; Dan Oliver, *Necessary Gateskeeping*, NAT'L REV., May 4, 1998, at 43.

10. Kenneth Starr, Progress and Freedom Foundation and the Brookings Institution, Remarks, *in Microsoft Antitrust Case and Computer Industry Competition*, (C-SPAN television broadcast, Feb. 22, 2001).

11. In the courtroom, Richard Schmalensee analyzed the market structure of the software industry. *See* Report of Direct Testimony of Richard Schmalensee, United States v. Microsoft Corp., 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233) (relying on the empirical work of Bernard J. Reddy et al., *Why Does Microsoft Charge So Little for Windows?*, NAT'L ECON. RESEARCH ASSOCS., Oct. 8, 1998. David S. Evans et al., *The Rise and Fall of Leaders in Personal Computer Software*, NAT'L ECON. RESEARCH ASSOCS., Jan. 7, 1999, and Kenneth G. Elzinga & David E. Mills, *PC Software* (Sept. 1998) (all prepared with support from Microsoft)).

12. STAN J. LIEBOWITZ & STEPHEN E. MARGOLIS, WINNERS, LOSERS & MICROSOFT: COMPETITION AND ANTITRUST IN HIGH TECHNOLOGY 154-57 (1999) [hereinafter LIEBOWITZ & MARGOLIS, LOSERS].

13. As Schmalensee wrote in the *American Economic Review*, the month after the trial ended:

> Economists tend to define predatory acts as, roughly, acts that are rational only if they chasten or eliminate competitors. Courts, aware of the cost of discouraging competition, tend to require more, including short-term losses from the acts at issue and plausible expectation of future recoupment of those losses. Clear evidence of intent may help a court decide whether a particular act was predatory. In Schumpeterian industries, however, with "winner take most" markets, neither the basic definition above nor evidence of intent is economically useful.
>
> If there can be only one healthy survivor, the incumbent market leader must exclude its competition or die. Any strategy that does not exclude competition

Evidence at trial revealed that precisely the opposite was true. Because the nature of the industry was not sufficient to entrench its monopoly, Microsoft resorted to repeated, well-documented and protracted campaigns of anti-competitive behaviors to squash its competition. If network externalities would have been sufficient to entrench Microsoft, the immense amount of managerial time and effort and the hundreds of millions, if not billions, of dollars it burned up foreclosing the market to competing products was wasted. It should not have needed to use all these business strategies; it could have relied on just delivering a better product in a networked industry.[14]

The trial also showed that Microsoft's claims to pursuing consumer friendly business tactics that serve the public were contradicted by its actions. If expanding demand for Windows by promoting a complementary product was Microsoft's concern, it did not have to spend hundreds of millions of dollars making sure the dominant browser was Explorer, not Navigator. Since innovation would be the key to any such "system" effects, Microsoft should never have slowed its own products or prevented other products from getting to market, since all innovation stimulates demand for

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will not result in survival. There is no useful non-exclusion baseline, which the traditional test for predation requires. Moreover, if near-monopoly is inevitable, welfare is not generally increased by restraining the ferocity of competition for that position, particularly if competition is channeled in directions that benefit consumers, such as innovation or low prices.

As to intent, in a struggle for survival that will have only one winner, any firm must exclude rivals to survive. The intent to exclude is the intent to survive. In a "winner take most" market, evidence that A intends to kill B merely confirms A's desire to survive.

Richard Schmalensee, *Antitrust Issues in Schumpeterian Industries*, 90 AM. ECON. REV. 192, 193-94 (2000).

14. As the *Economist* pointed out, the picture of a new form of beneficial monopoly, relying on network effects to dominate in a positive way, could not hide the reality of plain vanilla monopoly power.

If network effects did in fact assure monopoly power, the Microsoft monopoly in the operating-systems market would not have been illegal. Under the Sherman Act, monopoly is lawful. It is actions to defend or extend monopoly that break the law. On the view that bad standards are strongly self-reinforcing, no such monopoly-defending action would have been needed. . . .

New paradigm or old, the law has no quarrel with "natural monopolies." It is precisely because network effects were not enough to entrench Microsoft's monopoly—deliberate steps to stifle competition were required too—that the company may face draconian penalties.

Antitrust on Trial, ECONOMIST, Nov. 13, 1999, at 84. A liberal, journalistic version of the same conclusion can be found in Robert Kuttner, *Bill Gates, Robber Baron*, BUS. WK., Jan. 19, 1998, at 20.

Windows. Microsoft should not have cared which brand was used. It should certainly not have spent so much effort on forcing Navigator out of the Mac market.

If bundling were important to expanding demand by creating convenience and lowering costs, Microsoft should not have cared which complements were bundled, since the better they all worked, the greater the demand, but it repeatedly sought to prevent any product, other than its own, from being bundled on new PCs. If improved functionality and ease of use through integration of complement products were critical to stimulating demand, Microsoft should never have threatened to or actually withheld access to interfaces or jolted non-Microsoft products since they needed to function well to expand demand.

If Microsoft were seeking to increase revenues by steering customers through its browser to its portal, it should never have given AOL equal standing with MSN on the boot screen at no charge or allowed OEMs to direct customers to their portals, as long as they used Explorer, not Navigator.

If a pleasing consumer experience is important to expanding demand, Microsoft would have heeded the entreaties of OEMs to simplify and modify boot sequences, when they faced the wrath of dissatisfied consumers, instead of paying them to put up with consumer hassles. It would not have compromised the stability of the operating system with excessive integration.

Microsoft illegally eliminated competition to defend and extend its monopoly and imposed a heavy price on the public. Consequently, application of traditional antitrust rules will achieve exactly the reverse of what Microsoft claimed it would—it will promote innovation by allowing potential competitors, who would otherwise be quickly eliminated by the giant's anti-competitive behaviors, to have a fair chance to enter the market and eventually discipline the price and the quality of Microsoft's products.

B. Outline of the Article

This Article explains why the court had to reject Microsoft's defense by placing the mountain of evidence presented in the trial in a traditional structure-conduct-performance analytic framework.[15] The clear analytic base undermines the claim that the monopoly

15. F.M. SCHERER & DAVID ROSS, INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE 4 (1990); *see also* WILLIAM G. SHEPHERD, THE ECONOMICS OF INDUSTRIAL ORGANIZATION 5 (1985).

persists because of the unique natural tendencies of a new economy software market. It also provides the foundation for an effective remedy to restore competition in the software industry.

Section II presents an overview of the empirical facts within the structure/conduct/performance paradigm. Section III presents a discussion of the anti-competitive business model imposed by Microsoft on the software industry. Section IV presents a discussion of how this business model imposed harm on the public. Section V evaluates the remedy adopted by the court and extracts lessons for future antitrust activity in high technology industries.

II. Market Structure Conditions for Monopoly

A. Workably Competitive Markets: Structure–Conduct–Performance

The structure-conduct-performance (SCP) approach to the analysis of industry structure has been the dominant public policy paradigm in the United States for the better part of this century.[16] In SCP analysis the central concern is with market performance, since that is the outcome that affects consumers most directly. The concept of performance is multifaceted; it includes both efficiency and fairness. The measures of performance to which we traditionally look are pricing and profits, addressing both efficiency and fairness. They are the most direct measure of how society's wealth is being allocated and distributed.[17]

The performance of industries is determined by a number of factors, most directly the conduct of market participants.[18] Do they compete? What legal tactics do they employ? How do they advertise and price their products?

Conduct is primarily a product of other factors. Conduct is affected and circumscribed by market structure. Market structure includes an analysis of the number and size of the firms in the industry, their cost characteristics and barriers to entry, as well as the basic conditions of supply and demand.[19]

The focal point of market structure analysis is to assess the ability of markets to support competition, which "has long been viewed as a force that leads to an ideal solution of the economic performance

16. The Consumer Federation of America has applied a similar analysis to a variety of "network" industries. *See e.g., supra* note 1.

17. SCHERER & ROSS, *supra* note 15, at 4.

18. *Id.*

19. *Id.* at 5.

problem, and monopoly has been condemned."[20] The predominant reason for the preference for competitive markets reflects the economic performance they generate, although there are political reasons to prefer such markets as well.[21] In particular, competition fosters efficient allocation of resources, absence of excess profit, lowest cost production and provides a strong incentive to innovate.[22] Where competition breaks down, firms are said to have market power and the market falls short of these results.[23]

Pure and perfect competition is rare, but the competitive goal is important.[24] Therefore, a great deal of attention has been focused on the relative competitiveness of markets and conditions that make markets more competitive or workably competitive. Summarizing the literature, Scherer and Ross develop the following useful list of these characteristics:

Structural Criteria

The number of traders should be at least as large as scale economies permit.

There should be no artificial inhibitions on mobility and entry.

There should be moderate and price-sensitive quality differentials in products offered.

Conduct Criteria

Some uncertainty should exist in minds of rivals as to whether price initiatives will be followed.

Firms should strive to attain their goals independently, without collusion.

There should be no unfair, exclusionary, predatory, or coercive tactics.

Inefficient suppliers and customers should not be shielded permanently.

Sales promotions should be informative, or at least not misleading.

There should be no persistent, harmful price discrimination.

Performance Criteria

Firms' production and distribution operations should be efficient and not wasteful of resources.

20. *Id.* at 15.
21. *Id.* at 18.
22. *Id.* at 4, 20.
23. *Id.* at 17-18.
24. *Id.* at 16-17.

> Output levels and product quality (that is variety, durability, safety, reliability, and so forth) should be responsive to consumer demands.
>
> Profits should be at levels just sufficient to reward investment, efficiency, and innovation.
>
> Prices should encourage rational choice, guide markets toward equilibrium, and not intensify cyclical instability.
>
> Opportunities for introducing technically superior new products and processes should be exploited.
>
> Promotional expenses should not be excessive.
>
> Success should accrue to sellers who best serve consumer wants.[25]

B. Claims of Unique Competition in New Economy Industries

As noted in the introduction, Microsoft's experts in court argued for a new form of workable competition in the software industry. Schmalensee/NERA present a picture of dynamic competition in the software industry in which

> [c]ompetition in the software industry is based on sequential races for the leadership of categories such as word processing, spreadsheets, personal financial software, games, operating systems, and utilities—not to mention currently unknown categories from which the next generation of "killer applications" will emerge.[26]

Outside of the courtroom, a conservative think tank gave prominence to the arguments in a book entitled, *Winners, Losers and Microsoft* (hereafter referred to as *Losers*).[27] The authors argue that in the software industry, competition never achieves an equilibrium between companies within a market. Rather competition simply takes place for the entire market. Leaders change when they produce superior products and they capture the entire market.

> Because bigger is better in increasing-returns industries, such industries evolve into monopolies. Monopoly, however, does not lead inevitably to a bad economic outcome for society.... Sometimes an industry develops in such a way that monopoly is not only a likely outcome but also a desirable one. In such industries, what we are likely to witness is not conventional monopoly, but rather serial monopoly. [28]

25. *Id.* at 53-54.
26. Report of Direct Testimony of Richard Schmalensee, *supra* note 11, at 17.
27. LIEBOWITZ & MARGOLIS, LOSERS, *supra* note 12.
28. *Id.* at 10-11.

> . . . .
>
> Such markets will . . . be "winner-take-all," but only for a while. That is, they will exhibit *serial monopoly*.[29]

Losers purports to show that Microsoft products win in the marketplace because they are higher in quality and that the presence of Microsoft in the marketplace causes prices to decline.

> In the special environment of serial monopoly, monopolistic-looking firms that offer an inferior deal to consumers are readily replaced. In such circumstances, an attempt to exploit a monopoly by restricting output and raising price is suicidal. Further, in the environment of serial monopoly, firms, even monopolistic ones, will end up decreasing their profits if they handicap their products in some way. For example, if they unwisely bundle goods into their product that cost more than they are worth, given the available alternatives, they will lose out. In short, in the environment of serial monopoly (unlike conventional monopoly) the punishment for inferior products, elevated prices or inefficient bundling is obsolescence and replacement.[30]

This view claims that the anti-competitive practices Microsoft used have nothing to do with the monopoly outcome.

> In other software markets, we have consistently found that market share is strongly related to product quality and that market share responds quickly to quality differentials. We would expect a similar relationship in the browser market. . . .
>
> . . . .
>
> Given all this—the quality advantage of Internet Explorer, the enhanced ability of users to switch products, and the ease of providing additional copies of browsers—Internet Explorer's increase in market share can quite easily be explained. One does not need to appeal to other factors such as those the government has focused on in its case against Microsoft (that is, ownership of the operating system or exclusionary contracts) to explain Microsoft's increasing share of the market. [31]

This argument builds on recent new economic theory that challenges the traditional competitive market model. This school of thought, drawing on the works of Schumpeter,[32] argues that "firms need protection from competition before they will bear the risks and costs of invention and innovation, and a monopoly affords an ideal

29. *Id.* at 137.
30. *Id.* at 11.
31. *Id.* at 219-22.
32. *See, e.g.*, JOSEPH A. SCHUMPETER, CAPITALISM, SOCIALISM AND DEMOCRACY (1942).

platform for shooting at the rapidly and jerkily moving targets of new technology."[33]

It argues that basic conditions are so different that the idea of competition among a substantial number of competitors is rendered obsolete. The recent theory holds that in some industries, under some conditions, a dominant firm and a dominant technology can lead to a "virtuous circle" in which positive externalities feed on themselves to propel economic progress.[34] By organizing demand around a standard product, the cost of production falls.

In the computer hardware industry positive feedback loops sustain change and productivity growth that are orders of magnitude larger than typified the industrial age.[35] Advances in computing technology support more advances in computing technology.[36] Standardized and pre-installed bundles of software appear to have allowed the rapidly expanding capabilities of computer hardware to become accessible and useful to consumers with little expertise in computing.[37]

As more and more people use the product, the value to each increases, especially in communications and network industries where people talk to one another. The classic case is the telephone network (or the Internet), where each individual derives greater benefit through the ability to contact numerous other individuals directly.[38] There may be indirect benefits in virtual networks in which two consumers never actually come face-to-face or computer-to-computer. Support services, maintenance and repair, as well as libraries of applications become more readily available. Larger numbers of users seeking specialized applications create a larger

33. SCHERER & ROSS, *supra* note 15, at 31.

34. The arguments have been explicitly applied to the Microsoft case. *See* John E. Lopatka & William Page, *Microsoft, Monopolization, and Network Externalities: Some Uses and Abuses of Economic Theory in Antitrust Decisionmaking*, 40 ANTITRUST BULL. 265 (1995).

35. Brian R. Gaines, *The Learning Curve Underlying Convergence*, 1998 TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE 30-31.

36. Brian Arthur, *Positive Feedbacks in the Economy*, SCI. AM., Feb. 1990, at 95-96.

37. Michael Katz & Carl Shapiro, *Antitrust and Software Markets*, *in* COMPETITION, INNOVATION AND THE MICROSOFT MONOPOLY: ANTITRUST AND THE DIGITAL MARKETPLACE (Jeffrey A. Eisenbach & Thomas M. Lenard eds., 1999) [hereinafter Katz & Shapiro, *Antitrust and Software*].

38. Jeffrey Church & Neil Gandal, *Complementary Network Externalities and Technological Adoption*, 11 INT'L J. INDUS. ORG. 239, 241 (1993).

library of applications that become available to other users,[39] and secondary markets may be created.

By increasing the number of units sold, the cost per unit falls dramatically.[40] On the supply side, certain industries, like computing and networking industries, tend to have high fixed and front end costs. Cost savings apply not only to initial production costs, but also to service and maintenance costs.[41] As the installed base of hardware and software deployed grows, learning and training in the dominant technology is more valuable since it can be applied to more users and uses.[42] Firms seek to capture these positive externalities and accomplish technological "lock-in."[43] After capturing the first generation of customers and building a customer and programming base tied to dominant software, it becomes difficult, if not impossible, for later technologies to overcome this advantage. Customers hesitate to abandon their investments in the dominant technology and customer acquisition costs rise for latecomers.

III. Economic Theory v. Business Reality

A. Market Structure

(1) Market Dominance

Painting a picture of empirical reality to support the theory proved a difficult proposition for Microsoft's expert witness. Citing work commissioned by Microsoft at National Economic Research Associates (NERA), Schmalensee argued that Microsoft's current market dominance was not a source of market power because entry into the software industry is easy.[44] He tried to demonstrate this by presenting a historical analysis of software category leaders and cataloguing the availability of alternatives. When Windows 95 replaced Windows 3.0, Schmalensee/NERA claimed, there was a change in leadership, even though Microsoft develops, markets, and controls both products.

39. *Id.*; *see also* Chou Chien-fu & Oz Shy, *Network Effects Without Network Externalities*, 8 INT'L J. INDUS. ORG. 259, 260 (1990).

40. Arthur, *supra* note 36, at 92-93.

41. Melissa A. Schilling, *Technological Lockout: An Integrative Model of the Economic and Strategic Factors Driving Technology Success and Failure*, 23 ACAD. MGMT. REV. 267, 270 (1998).

42. *Id.*

43. HAL VARIAN & KARL SHAPIRO, INFORMATION RULES (1999).

44. Report of Direct Testimony of Richard Schmalensee, *supra* note 11, at 18-20.

The objective was to give the impression that leadership is always changing hands in the software industry and that Microsoft is just one of the companies that could be replaced at any moment. Thus, Schmalensee/NERA attempted to show that fourteen different products dominate the five major software categories and no product dominates for long. According to this view, every category but one has at least three leaders. Most periods of leadership are short, less than a decade.

There is simply no justification to consider a change in the model of a product a change in market leadership or domination. When markets are viewed through the lens of the firm the picture is quite different (see Exhibit III-1). There are eight firms that have held a leadership position in one or more categories. There is only one firm that totally dominates the landscape.

Microsoft has dominated the operating system category for sixteen years and still does. No other firm has come close to replicating either Microsoft's market share or its period of dominance. Five generations of Intel-based PCs have seen no change in the dominant firm.

Microsoft is the only firm to achieve a market share exceeding 90%, first in the operating system and then in the office suite. It is the only firm to achieve the generally accepted monopoly level of 65-70% in more than one software market.

Microsoft is the only firm to dominate more than one category on the list. It dominates four of the five simultaneously and has never relinquished domination once it conquers a market.

Microsoft is the only firm on the list that purchased, rather than created, the basic programs in virtually every category it dominated.

In the one area where Microsoft has not achieved dominance, personal finance programs, it attempted to buy the industry leader but was rebuffed by the Department of Justice. The reason it has failed to dominate this area is also revealing. Schmalensee recognized that personal finance software is not as heavily subject to network externalities.[45] Microsoft is less able to leverage its market power over the operating system to conquer this market, perhaps that is why it failed.

When Schmalensee analyzed the installed base of users, he gave a similarly distorted view.[46] He simply left out Microsoft's base. He identified approximately twenty-three million non-Microsoft users,

45. *Id.* at 39.
46. *Id.* at 50-55.

split roughly equally between Mac and others.[47] The suggestion is that the non-Microsoft market is large enough to provide a base for competition. This approach is misleading, since the Microsoft installed base is at least twelve times as large as the combined competition, and could be as much as twenty times as large depending on what one assumes about the life-span of computers (see Exhibit III-2). It is approximately twenty-five times as large as the next largest competitor. It is over thirty times as large as the next largest PC-based competitor. Given the huge advantage in economies of scale attendant on such a base, it is extremely difficult for entrants to build a business on the basis of the non-Microsoft installed base.[48] A realistic analysis of industry leadership contradicts the Microsoft view. There is no "serial" in Microsoft's monopoly.

(2) Barriers to Entry

As unconvincing as the market structure analysis was, the second prong of the Microsoft argument was even weaker. Microsoft's defenders claimed that its dominant market position and extremely high market share do not constitute a basis for the exercise of market power because entry and exit in the software industry are extremely easy. Switching costs, compatibility problems and network effects are not substantial entry barriers.[49]

Microsoft executives knew full well that each of the problems that Schmalensee/NERA dismissed is actually a *"huge"* barrier. Through their words and deeds Microsoft's senior executives demonstrated that they believed the opposite of what the experts said and acted in exactly the opposite manner in the market. Microsoft's witnesses asked the court to disregard their words and deeds and believe that Microsoft executives did not understand their own market.

In a December 1997 memorandum, the Senior VP responsible for pricing to Microsoft's most important customers—computer manufacturers (original equipment manufacturers or OEMs)—

47. *Id.* at 54.

48. The discussion of the number of available programs is similarly distorted. Schmalensee/NERA identify thousands of programs available for competing operating systems. Mac is identified with about 12,000 programs in 1998. *See* Report of Direct Testimony of Richard Schmalensee, *supra* note 11, at 54. Windows had twice as many programs available five years ago. *See* Declaration of David Sibley at 14, United States v. Microsoft Corp., 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233) (citing a figure of 25,000 for 1993).

49. Report of Direct Testimony of Richard Schmalensee, *supra* note 11, at 55-63.

concluded that Microsoft's high prices were protected by a variety of barriers to entry.[50] Although computer manufacturers had an incentive to compete in operating systems because of Microsoft's high prices, they faced problems of consumer switching costs.[51] Software vendors were stymied by compatibility problems.[52] Even Intel could not compete in operating systems,[53] since Microsoft could respond to such a threat by using its deep pockets to buy a chip manufacturer and bolt its operating system onto the CPU, leveraging control of compatibility to defend and extend its monopoly.[54] So much for the

50. Government Exhibit #365: Memorandum from Joachim Kempin to Bill Gates, dated Dec. 16, 1997, United States v. Microsoft, 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233); *see also* Mary Jo Foley, *Who is Microsoft's Secret Power Broker?*, ZDNET, Feb. 1, 1998 (describing Joachim Kempin by saying "he has the final sign-off on all Microsoft licensing contracts with all hardware makers ... and he is the Microsoft official around whom swirls most of the current Microsoft vs. DOJ fireworks").

51. Government Exhibit #365: Memorandum from Joachim Kempin to Bill Gates, dated Dec. 16, 1997, United States v. Microsoft, 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233).

> Our high price could get a single OEM or a coalition to fund a competing effort. While this possibility exists I consider it doubtful even if they could get a product out that they can market it successfully, leapfrog us and would not deviate them from their own standard. Could they convince customers to change their computing platform is the real question. The existing investments in training, infrastructure and applications in windows computing are huge and will create a lot of inertia.

Id.

52. *Id.*

> SUN and its coalition with Java. For the next 2-3 years the barriers are huge... In addition there is the compatibility barrier... [Netscape] may come from the browser side, but I consider them too weak to succeed alone—so they are only dangerous if they team up with SUN. Again compatibility and yet another platform are the biggest inhibitors.

Id.

53. *Id.*

> This could be an INTEL led and funded coalition—say with Compaq and Netscape. I am convinced they have been thinking about this for some time. They could buy SUN SOFT or start a skunk work project on their own. If they decide to sell the Operating System for $1 and the CPU for $200 they will get the OEMs on their side. The customer inertia argument remains and that will prevent them to build momentum easily.

Id.

54. *Id.*

> Our reaction could be to buy National semiconductor or AMD or both and own the CPU and the SW business—while both stocks are taking a dive. We would sell SW at $100 and CPU at cost +1. How sure are we of our partnership and how fast could we react if needed? We could bring compatibility to another platform better than anybody else and we would have the money to fund the fabrication capacity.

Id.

claim that a brilliant computer science major in his garage can displace Microsoft;[55] not even the combination of Intel, Compaq, Sun and Netscape can overcome these barriers to entry.[56]

B. Corporate Conduct

(1) The War Against the Browser

Microsoft's defense of its conduct relies on a claim that it just competes very hard in every product market it enters.[57] Its experts place a great deal of emphasis on product quality. Microsoft's domination of product lines is attributed to the fact that, while it starts behind in most products, it develops equal quality and then wins the market.[58] The whole market tips to Microsoft, once their product is superior.[59] In particular, *Losers* claims that by 1996 Internet Explorer had pulled equal with Netscape Navigator.[60]

As with the evidence on market structure, the direct evidence on conduct refutes the claims of Microsoft experts with great specificity. Contradicting the theory, this was the very moment at which Microsoft executives were redoubling their efforts to use their "other factor" leverage to drive Netscape from the market.[61] Competing on quality was not at all what Microsoft had in mind. Foreclosing the market was. Microsoft went to great lengths to bring that result about.

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55. Report of Direct Testimony of Richard Schmalensee, *supra* note 11, at 47.

56. In this regard, the fact that Microsoft has successfully prevented Intel from developing its NSP software as disclosed in the trial is a very important element of the overall case. Intel could not, over Microsoft's objection, even bring a new piece of software to market in a field that Microsoft did not dominate. The chances it could bring a competing system to market are even smaller. *See Microsoft*, 84 F. Supp. 2d at 94-103.

57. Report of Direct Testimony of Richard Schmalensee, *supra* note 11, at 127.

58. *Id.*

59. See LIEBOWITZ & MARGOLIS, LOSERS, *supra* note 12, at 165-73.

60. *Id.* at 217-23.

61. *See Microsoft*, 84 F. Supp. 2d at 51 (quoting messages from James Allchin to Paul Maritz).

> I don't understand how IE [Internet Explorer] is going to win. The current path is simply to copy everything that Netscape does packaging and product wise.... We are not leveraging Windows from a marketing perspective and we are trying to copy Netscape and make IE into a platform. We do not use our strength—which is that we have an installed base of Windows and we have a strong OEM shipment channel for Windows. I am convinced we have to use Windows—this is the one thing they don't have... We have to be competitive with features, but we need something more—Windows integration.

Id.

The evidence at trial focuses on Microsoft's battle to prevent Netscape/Java from becoming a threat to the Microsoft monopoly through insertion into the middle of the market,[62] although the evidence indicates that the abusive business model affected many markets over the course of at least a decade.[63] The CEO of the company made it clear that the browser was a competitive threat to Microsoft's dominant position.

> A new competitor "born" on the Internet is Netscape. Their browser is dominant, with 70% usage share, allowing them to determine which network extensions will catch on. They are pursuing a multi-platform strategy, where they move the key API into the client to commoditize the underlying operating system.[64]

As Microsoft saw it, Netscape/JAVA could weaken its hold on the market because they were able to insert themselves between the Windows operating system and the applications that ran on top of it. They are "middleware." They offer independent software vendors (ISVs) the possibility of writing applications that can work with many operating systems. They do this by making available to programmers the applications programming interfaces (APIs). When APIs are exposed, programmers can "call" them to develop new applications.

Because they hope to be compatible with numerous operating systems and hope to support many applications, these "middleware" programs make consumers indifferent to which operating system is used. This threatens to weaken Microsoft's hold on the market. In its terms, it "commoditizes" its core product. If a competitor can create a stock of compatible applications, he can advertise that the new operating system can run all the existing programs, undermining the economic leverage of Windows. If the installed base of platforms and browsers are out there, the Windows operating system could be bypassed. By capturing the browser market, Microsoft precluded that possibility. The campaign against Netscape simultaneously extended the monopoly into the browser market and defended the monopoly in the operating system market by preserving the barrier to entry.

62. *See id.* at 28-29.

63. *See generally* JENNIFER EDSTROM & MARLIN ELLER, BARBARIANS LED BY BILL GATES (1998); WENDY GOLDMAN ROHM, THE MICROSOFT FILE (1998); RANDALL E. STROSS, THE MICROSOFT WAY (1997); JOHN WALLACE & JIM ERICKSON, HARD DRIVE (1992).

64. Government Exhibit #20: Memorandum from Bill Gates, The Internet Tidal Wave, dated May 26, 1995, United States v. Microsoft, 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233) [hereinafter *Internet Tidal Wave*].

Microsoft's first response to the growth of the Internet and the development of the browser as a threat to its operating monopoly appears to have been to attempt to divide the market or gain a mutual non-aggression agreement.[65] That is, it sought to convince a competitor to go in one direction, while it went in another. There are at least four examples in the evidence in which Microsoft sought to divide the market. Microsoft attacked Intel's contemplation of developing software applications, denying consumers functionalities for years.[66] Apple software efforts were also the object of Microsoft efforts to divide markets.[67] IBM was a particular target for Microsoft efforts to seal off its market.[68]

If the market division proposal was turned down, Microsoft threatened to go into the competitors' line of business more vigorously. While the attack on Netscape was the central focus of the case, other instances also involved major players in the industry.[69] Using the operating system as the core of its market power,[70] Microsoft erects barriers to entry. It freezes out competitors with incompatibilities,[71] builds in features to impede or disable competing programs,[72] withdraws support for competitor programs,[73] and locks customers in with constant imitation of competing products[74] or promises to imitate them.[75] These practices make it difficult for competitors to design products that operate well as the operating

65. *Microsoft*, 84 F. Supp. 2d at 30-31.
66. *Id.* at 34.
67. *Id.* at 36.
68. *Id.* at 28-43.
69. *Id.* at 34-44.
70. EDSTROM & ELLER, *supra* note 63, at 207.
71. *The World According to Microsoft*, PC WK. ONLINE, June 8, 1998.
72. The practices span at least three generations of operating systems. It began with the "scare message" in Windows 3.1 to makes DR-DOS users "feel uncomfortable and when he has bugs, suspect the problem is DR-DOS and then go out and buy MS-DOS or decide not to take the risk for the other machines he has to buy for his office." ROHM, *supra* note 63, at 89. Windows 95 and Windows 98 have apparently disabled competitors' programs rather than warn about possible incompatibilities. *See* James Gleick, *Making Microsoft Safe for Capitalism*, 1996 ANTITRUST L. & ECON. REV. 71, 81; *Windows 98 Disables Microsoft Competitors' Software*, CNET, July 4, 1998l.
73. ROHM, *supra* note 63, at 69, 70; *Mine All Mine*, TIME, June 5, 1995.
74. *See* Willow A. Sheremata, *Barriers to Innovation: A Monopoly, Network Externalities, and the Speed of Innovation*, 42 ANTITRUST BULL. 937, 941, 964, 967 (1997) [hereinafter Sheremata, *Barriers to Innovation*].
75. The preannouncement issue received considerable attention during the first federal action against Microsoft. ELLER & EDSTROM, *supra* note 63, at 42-43; WALLACE & ERICKSON, *supra* note 63, at 240-48.

system is manipulated and changed.[76] There also have been charges of back room campaigns of intimidation,[77] abrogation of contracts,[78] patent infringement,[79] and predatory pricing, in which the profits from the monopoly over the operating system are used to drive competitors out of other software lines.[80]

As was its practice, when Microsoft's overture to divide the market with Netscape was rebuffed, it set out to market a browser of its own using its well-tested strategy of tying applications to its operating system product.[81] There is no evidence that Microsoft's Internet browser was superior in any way to its competitors. The preservation of its operating system monopoly was the driving force in Microsoft's entry into the browser market. This is the core of the case against Microsoft.[82] Being an innovative leader was not how this battle was to be won,[83] leverage and tying were the key,[84] including

76. EDSTROM & ELLER, *supra* note 63, at 117. ROHM, *supra* note 63, at 187 recounts the complaints about the desktop applications. Gleick, *supra* note 72, at 87 notes a similar phenomenon with respect to the Internet.

77. ROHM, *supra* note 63, at 148, 237, 270.

78. The line between imitation and abrogation of contracts or patent infringement has never been very clear in Microsoft's business model and has resulted in repeated disputes including court cases involving Stac Electronics, ROHM, *supra* note 63, at 147-151, as well as settlements of similar claims including CPM, see JOHN WALLACE, OVERDRIVE 41 (1997) and ROHM, *supra* note 63, at 41, and others such as pen-based systems, see ROHM, *supra* note 63, at 93-101, and hardware, see WALLACE & ERICKSON, *supra* note 63, at 390.

79. *See* ROHM, *supra* note 63, at 93-101, 147-51; Alan Akin, *Microsoft and 3D Graphics: A Case Study in Suppressing Innovation and Competition,* July 16, 1997 (posted on Boycott Microsoft *available at* http://www.vcnet.com/bms/features/); Microsoft's strategy, also known as "embrace and extend," is not new. Gates first mentioned it publicly in *Mine All Mine,* TIME, June 5, 1998.

80. WALLACE, *supra* note 78, at 162-65.

81. United States v. Microsoft Corp., 84 F. Supp. 2d 9, 43 (D.D.C. 1999).

82. United States v. Microsoft Corp., 87 F. Supp. 2d 30, 52-57 (D.D.C. 2000).

> Microsoft paid vast sums of money, and renounced many millions more in lost revenue every year, in order to induce firms to take actions that would help enhance Internet Explorer's share of browser usage at Navigator's expense.... In fact, Microsoft has expended wealth and foresworn opportunities to realize more in a manner and to an extent that can only represent a rational investment if its purpose was to perpetuate the applications barrier to entry. Because Microsoft's business practices "would not be considered profit maximizing except for the expectation that... the entry of potential rivals" into the market for Intel-compatible PC operating systems will be "blocked or delayed," Microsoft's campaign must be termed predatory.

Id.

83. *Id.* at 160.

> First we need to offer a decent client (O'Hare) that exploits Windows 95 shortcuts. However, that alone won't get people to switch away from Netscape. We need to figure how to integrate Blackbird, and help browsing into our Internet client.... We need to move all of our Internet value added from the

efforts to undermine the quality of the competing product.[85] Integration was a business strategy[86] to foreclose a competitor, including a delay in the release of Windows 98 until Internet Explorer 4.0 was ready to be included with that product, even though it hurt Microsoft's most important customers, the OEMs.[87]

The trial fully documented a campaign to cut off a potential competitor's air supply by making it difficult to sell, find, or use his products, by shutting down distribution channels, denying advertising and promotion channels, undermining its functionality, denying it resources and causing it to expend resources. Microsoft carried out its war against this and other middleware threats by attempting to ensure that no PC industry participants would in any way support or assist Netscape/JAVA.[88]

At the heart of Microsoft's anti-competitive practices are four categories of abuses. First, Microsoft took steps to prevent

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Plus pack into Windows 95 itself as soon as we possibly can with a major goal to get OEMs shipping our browser preinstalled.

Id.

84. *Id.*

If you agree that Windows is a huge asset, then it follows quickly that we are not investing sufficiently in finding ways to tie IE and Windows together... most importantly it must be killer on OEM shipments so that Netscape never gets a chance on these systems.

Id. at 166.

85. *Id.*

Microsoft's executives believed that the incentives that its contractual restrictions placed on OEMs would not be sufficient in themselves to reverse the direction of Navigator's usage share. Microsoft set out to bind Internet Explorer more tightly to Windows 95 as a technical matter. The intent was to make it more difficult for anyone, including systems administrators and users, to remove Internet Explorer from Windows 95 and to simultaneously complicate the experience of using Navigator with Windows 95. As Brad Chase, Vice President for developers and windows marketing, wrote to his superiors near the end of 1995, "We will bind the shell to the Internet Explorer, so that running any other browser is a jolting experience."

Id. at 160.

86. *Id.* at 167.

87. *Id.*

Maritz recognized that the delay would disappoint OEMs. First, while OEMs were eager to sell new hardware technologies to Windows users, they could not do this until Microsoft released Windows 98, which included software support for the new technologies. Second, OEMs wanted Windows 98 to be released in time to drive sales of PC systems during the back-to-school and holiday selling seasons. Nevertheless, Maritz agreed with Allchin's point that synchronizing the release of Windows 98 with Internet Explorer was "the only thing that makes sense even if OEMs suffer."

Id.

88. *Id.* at 58-85.

competitors from getting the same access to users of computers or services who had entered into an agreement with Microsoft. If OEMs, ISPs, or ICPs were inclined to install other browsers, Microsoft sought to ensure that no browser would have equal placement.[89] Second, it sought to foreclose distribution channels to other browsers altogether. Contracting parties were required to ship IE, and dissuaded from shipping competing browsers.[90] Third, it took actions which were intended to ensure IE's quality was superior to browsers operating on Windows machines. Contracts required use of software that gave Microsoft a superior presentation, while the underlying software also disabled competitors.[91] Finally, there were conditions to prevent competitors from garnering resources.[92]

The quality analysis presented by Microsoft defenders is undercut by the trial evidence. It shows that Microsoft may have "won" the trade press reviews not so much because it built a better mouse trap but because it impaired the ability of its competitors to build one.[93] At exactly the time that the trade press reviews of Microsoft's browser were catching the reviews of Netscape's browser, Microsoft had launched a campaign to undermine the quality of its competition. Not only did Microsoft manipulate the operating system to give its product an advantage, it denied or slowed access to its operating system to prevent Netscape from improving and delivering its product.[94]

89. *Id.* at 59-67.
90. *Id.* at 67-69.
91. *Id.* at 49-53.
92. *Id.* at 51.
93. *Id.* at 111-12.
94. *Id.*

Although Netscape declined the special relationship with Microsoft, its executives continued over the weeks following the June 21 meeting to plead for the RNA API. Despite Netscape's persistence, Microsoft did not release the API to Netscape until late October, *i.e.*, as Allard had warned, more than three months later. The delay in turn forced Netscape to postpone the release of its Windows 95 browser until substantially after the release of Windows 95 (and Internet Explorer) in August 1995. As a result, Netscape was excluded from most of the holiday selling season.

Microsoft similarly withheld a scripting tool that Netscape needed to make its browser compatible with certain dial-up ISPs. Microsoft had licensed the tool freely to ISPs that wanted it, and in fact had cooperated with Netscape in drafting a license agreement that, by mid-July 1996, needed only to be signed by an authorized Microsoft executive to go into effect. There the process halted, however. In mid-August, a Microsoft representative informed Netscape that senior executives at Microsoft had decided to link the grant of the license to the resolution of all open issues between the companies. Netscape never received a

In addition, the court makes the point that under the weight of the anti-competitive onslaught, Microsoft's competitors were forced to give up. Squeezed out of the market and drained of resources, they could no longer afford to devote resources to the product.

> Not only did Microsoft prevent Navigator from undermining the applications barrier to entry, it inflicted considerable harm on Netscape's business in the process. By ensuring that the firms comprising the channels that lead most efficiently to browser usage distributed and promoted Internet Explorer to the virtual exclusion of Navigator, Microsoft relegated Netscape to more costly and less effective methods of distributing and promoting its browsing software. After Microsoft started licensing Internet Explorer at no charge, not only to OEMs and consumers, but also to IAPs, ISVs, ICPs, and even Apple, Netscape was forced to follow suit. Despite the fact that it did not charge for Internet Explorer, Microsoft could still defray the massive costs it was undertaking to maximize usage share with the vast profits earned licensing Windows. Because Netscape did not have that luxury, it could ill afford the dramatic drop in revenues from Navigator, much less to pay for the inefficient modes of distribution to which Microsoft had consigned it. The financial constraints also deterred Netscape from undertaking technical innovations that it might otherwise have implemented in Navigator. Microsoft was not altogether surprised, then, when it learned in November 1998 that Netscape had surrendered itself to acquisition by another company.[95]

It is impossible to argue that quality won the day in the browser market. There is no way to know what would have happened in a marketplace where fair competition was taking place, although Microsoft's executives clearly believed that if they did not leverage their market power in the operating system, they would lose the browser war.[96]

(2) SmartSuite

Antitrust courts can look at past patterns of behavior, both in reaching conclusions about current conduct and in crafting remedies.[97] Another product that makes a significant appearance in the court case (and *Losers*) is IBM's SmartSuite. The court concludes

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license to the scripting tool, and as a result, was unable to do business with certain ISPs for a time.

Id. at 33-34.

95. *Id.* at 103-04.

96. *See id.* at 51.

97. *Id.* at 34.

that Microsoft leveraged its control over the operating system to attack this product. Over this period, IBM's ability and intention to preinstall an office suite brought retaliation from Microsoft and reduced its shipment of computers substantially.[98]

> The IBM PC Company had begun negotiations with Microsoft for a Windows 95 license in late March 1995. For the first two months, the negotiations had progressed smoothly and at an expected pace. After IBM announced its intention to acquire Lotus, though, the Microsoft negotiators began canceling meetings with their IBM counterparts, failing to return telephone calls, and delaying the return of marked-up license drafts that they received from IBM. Then, on July 20, 1995, just three days after IBM announced its intention to pre-install SmartSuite on its PCs, a Microsoft executive informed his counterpart at the IBM PC Company that Microsoft was terminating further negotiations with IBM for a license to Windows 95. Microsoft also refused to release to the PC Company the Windows 95 "golden master" code. The PC Company needed the code for its product planning and development, and IBM executives knew that Microsoft had released it to IBM's OEM competitors on July 17. Microsoft's purported reason for halting the negotiations was that it wanted first to resolve an ongoing audit of IBM's past royalty payments to Microsoft for several different operating systems.[99]

Thus, as in the case of the browser, Microsoft centered its attention on denying a competing product the easiest means of distribution—preinstallation. Microsoft sought to prevent IBM from preinstalling its office suite on its computers. Interestingly, this battle to convince IBM not to preinstall its office suite was essentially an attempt to divide the market, to have IBM focus on being a hardware company and stay out of the software business. The instruments that Microsoft used to undermine IBM's preinstallation of a competing product are familiar—delay and desupport by leveraging the operating system.

This is not the only reason that Microsoft's Office came to dominate this market, but it was a landmark on Microsoft's abusive timeline. This was a crucial moment to prevent a competitor from

98. Gleick, *supra* note 72, at 88.

> In 1991, Mike Maples, a senior Microsoft executive, described the company's goals in the aggressive style that its top executives use to favor: If someone thinks we're not after Lotus and after WordPerfect and after Borland, they're confused.... My job is to get a fair share of the software applications market, and to me that's 100 percent.

Id.

99. United States v. Microsoft Corp., 84 F. Supp. 2d 9, 40 (D.D.C. 1999).

gaining an installed base according to the data in *Losers*.[100] Microsoft's advantage came from leveraging the operating system and impairing the ability of the most important competitor to ship its product. Microsoft executives certainly thought that the leverage was helping. When a senior Microsoft executive argued for leveraging the operating system more to win the browser wars, he pointed to the Office market as an example of how leverage works.

> Let's [suppose] IE is as good as Navigator/Communicator. Who wins? The one with 80% market share. Maybe being free helps us, but once people are used to a product it is hard to change them. Consider Office. We are more expensive today and we're still winning. My conclusion is that we must leverage Windows more. Treating IE as just an add-on to Windows which is cross-platform [means] losing our biggest advantage—Windows market share. We should dedicate a cross group team to come up with ways to leverage Windows technically more .... We should think about an integrated solution—that is our strength.[101]

(3) The Operating System: DR-DOS and NewWave

In presenting Microsoft's history of leadership, its defenders try to invoke its track record of innovation in its defense, yet that history can be used to prove exactly the opposite. In fact, if we go back to the late 1980s and early 1990s, we find that the "other factors" were at least as prominent as they were in the Browser case.[102] The claim that Microsoft gained its advantage by being a leader on the quality side is contradicted by its vigorous pursuit of imitation combined with anti-competitive practices.[103]

The elimination of the last significant competing operating system from the Intel-based PC market is central to understanding how leverage was used at this crucial time in the software market. The victory over DR-DOS did not rest on a quality advantage.[104]

100. LIEBOWITZ & MARGOLIS, LOSERS, *supra* note 12, at 146-47.

101. *Microsoft*, 84 F. Supp. 2d at 51.

102. *See* LIEBOWITZ & MARGOLIS, LOSERS, *supra* note 12, at 150-157.

103. EDSTROM & ELLER, *supra* note 63, at 207; Gleick, *supra* note 72, at 82; David B. Yoffie, *CHESS and Competing in the Age of Digital Convergence*, *in* COMPETING IN THE AGE OF DIGITAL CONVERGENCE 27 (Harvard Business School ed., 1997).

104. Sheremata, *Barriers to Innovation*, *supra* note 74, at 942.

> At the time DR-DOS 5.0 received much critical acclaim as the superior product. However 1 month after DRI introduced DR-DOS 5.0, Microsoft preannounced a similar set of features for MS-DOS. Although Microsoft did not ship these features until over 1 year later, by 1993 market share for DR-DOS had fallen to 3%. MS-DOS share rose to 79%.

Rather, Microsoft imposed contract conditions on suppliers that foreclosed and deterred competition. The early use of contracts to secure the operating system monopoly against its rival, DR-DOS, is central to Microsoft's dominance in the 1990s.

> By 1991 account managers would read the terms of the licensing policy in their OEM manuals in brief form. The new licensing terms had started in the Far East, when low-cost clone vendors were happy to increase their slim profit margins by using a cheaper but better version of DOS—from DRI. Microsoft had implemented what eventually became known as "per processor" licenses, which effectively locked computer makers into contracts that required them to pay for the Microsoft operating system on every computer.[105]

Moreover, at the same time Microsoft was leveraging DR-DOS out of the market, it was leveraging competing desktop applications out of the market.[106] As with the browser, these earlier cases of leveraging involved more than just shutting down distribution channels. The full range of technical and economic weapons were

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> However, MS-DOS technology was based on CP/M which was an earlier version of DR-DOS. This lends credence to reports that DR-DOS was the product with superior quality. Apparently, Microsoft successfully applied its monopoly power to forestall competitive innovation.

Id.

105. ROHM, *supra* note 63, at 41.

106. *Id.* at 71, 77, 78.

> Gates, Lieven, Huels, and Reichel now discussed, among other things, an agreement "to get DRI/Novell out of Vobis," a strategic partnership between the two companies, and a commitment that Vobis would agree to sell "no Novell NetWare Lite" but instead would contract for 25,000 copies of Windows for Workgroups—a new product for Microsoft in the market for computer networks in which it had no presence....
>
> Among the e-mail messages not produced to the feds from the computers of Microsoft Germany was one that Bernard Vergnes sent to a number of other Microsoft executives on September 7, 1992. Along with documenting the Vobis deal, it showed Microsoft's intent to use its DOS contracts to leverage computer makers into buying Microsoft applications software in place of that from Lotus and others....
>
> In April 1991, Ballmer and Lieven had met in Nice. Ballmer had discussed other "inducements," as Lieven would testify, involving bundling Microsoft applications software with an operating system deal. A Microsoft Word/Excel combination was suggested as part of the DOS/Windows deal....
>
> After noting the success of Gates' meeting with Lieven, and the strong market presence of Vobis—number one in market share, over IBM—the memo said: Lieven... is willing to no longer offer DRI-DOS or Network Lied [*sic*]... As you know, Lotus and Borland have been aggressively approaching our OEMs, and Vobis is no exception.

Id.

used to drive competing software from the market and to undermine its attractiveness to consumers. Microsoft leveraged the operating system by creating incompatibilities.

> OLE, per se, wouldn't make its debut in Windows until 1992. It was heavily criticized for making the overall Windows system fat and bloated. OLE consumed memory, process cycles, and not surprisingly, was difficult for developers to support. Applications compatibility introduced a whole other set of constraints on applications developers. But that was exactly what it was designed to do. As Eller argued, OLE was *supposed* to be fat and bloated. Integration was all about making monolithic applications slowly trade components among each other.
>
> OLE was designed to protect developers of big applications who were afraid of being scooped by slick applets, little applications being crafted by much smaller development companies.
>
> Microsoft didn't want a lot of other companies writing code that could compete. It wanted to keep barriers to entry very high. The idea, in fact, was to keep raising the bar, putting in more layers of software and APIs, which developers would then have to support. Microsoft wanted to make it so gnarly that anybody who couldn't devote a team of one hundred programmers to every Windows application would be out of the game.[107]

From the outset, the process of building incompatibilities was driven by preservation of the monopoly on the operating system. In the early 1990s, Microsoft was already attacking "middleware" to ensure its dominance in the applications market.

> Established partly to promote code and resource sharing between Microsoft's Word and Excel Application groups, Whitten's team was also a reaction to a new software product from Hewlett Packard called NewWave.
>
> NewWave ran on top of Windows 2.03 and was part of HP's glowing vision of how the office of the future would work: orchestrated information sharing among different applications.
>
> If HP were successful, it could end up owning the application programming interfaces, or APIs, dictating how applications would run on a PC. If HP succeeded, instead of writing to Microsoft's Windows APIs, developers might write to HP's. This was an immediate threat.
>
> Nathan Myhrvold wrote of Microsoft's need to control API's in order to maintain its stranglehold on the operating systems business:

107. EDSTROM & ELLER, *supra* note 63, at 117.

> The relationship of an application to the system API is similar to the relationship that the roots of a tree have with the ground—it is very complicated and makes it difficult for third parties to clone. This helps prevent competitors from dislodging a successful operating system. Evolution and innovation provide another barrier as well as upgrade revenue. The system must evolve its APIs and implementation over time in order to remain successful. This gives ISVs more features to exploit, makes it more difficult to clone, and it gives users a reason to pay for an upgrade.
>
> The applications architecture group sprang forth immediately, and from it sprang object linking and embedding (OLE).[108]

Cross subsidies from operating system profits undermined the financial resources of competitors.

> WordPerfect's profits were further eroded in the early 1990s by the software price wars, which were part of Microsoft's strategy to keep prices low in order to establish market share. Microsoft could afford the razor thin margins that resulted because it had a steady revenue stream from DOS and Windows. Other companies, like Borland and WordPerfect, did not....
>
> "Gates wanted this business so badly that he was willing to give it [Microsoft Office] away for a while," said Kahn. "Because of his position in operating systems, he had no problems doing that because Microsoft was making so much money. Bill was buying market share and kicking everybody else from the market." [109]

Since Microsoft always used these anti-competitive "other factors" while it improved its product, it is simply impossible to conclude, as Schmalensee and *Losers* do, that quality won out.

IV. Market Performance: Consumer Harm

There are two readily identifiable areas of consumer harm in the court's findings—qualitative harm to consumers and monetary harm.[110] The court focused on issues of quality and innovation, although it did note pricing abuse.[111] A precise quantitative estimate of monetary harm was not a focal point in the courtroom because there could be no monetary penalty in this case. Identifying the pricing practices that indicated abuse, and the various anti-competitive uses to which the ill-gotten gains have been put, was

108. *Id.* at 113-14.
109. WALLACE, *supra* note 78, at 162-65.
110. United States v. Microsoft Corp., 84 F. Supp. 2d 30, 110-12 (D.D.C. 2000).
111. *Id.* at 57-66.

sufficient. Microsoft and its defenders have attempted to misrepresent this as a failure to show consumer harm.[112]

This chapter focuses on the issue of direct monetary harm and the exercise of monopoly power over price. It then briefly reviews the qualitative and indirect forms of harm imposed on the public by Microsoft's abuse of market power.

A. Microsoft's Pricing Strategy

One of the most critical areas of conduct and performance analysis is pricing practices. The court was closely cognizant of Microsoft's internal pricing analysis as an indicator of monopoly pricing, concluding that

> Microsoft's actual pricing behavior is consistent with the proposition that the firm enjoys monopoly power in the market for Intel-compatible PC operating systems. The company's decision not to consider the prices of other vendors' Intel-compatible PC operating systems when setting the price of Windows 98, for example, is probative of monopoly power. One would expect a firm in a competitive market to pay much closer attention to the prices charged by other firms in the market. . . .
>
> [I]t is indicative of monopoly power that Microsoft felt that it had substantial discretion in setting the price of its Windows 98 upgrade product (the operating system product it sells to existing users of Windows 95).
>
> Furthermore, Microsoft expends a significant portion of its monopoly power, which could otherwise be spent maximizing price, on imposing burdensome restrictions on its customers—and in inducing them to behave in ways—that augment and prolong that monopoly power. For example, Microsoft attaches to a Windows license conditions that restrict the ability of OEMs to promote software that Microsoft believes could weaken the applications barrier to entry. Microsoft also charges a lower price to OEMs who agree to ensure that all of their Windows machines are powerful enough to run Windows NT for Workstations. To the extent this provision induces OEMs to concentrate their efforts on the development of relatively powerful, expensive PCs, it makes OEMs less likely to pursue simultaneously the opposite path of developing "thin client" systems, which could threaten demand for Microsoft's Intel-compatible PC operating system products.[113]

112. *See* Stan J. Liebowitz, *An Expensive Pig in a Poke: Estimating the Cost of the District Court's Proposed Breakup of Microsoft*, ASS'N FOR COMPETITIVE TECH., Sept. 21, 2000 [hereinafter Liebowitz, *An Expensive Pig*].

113. *Microsoft*, 84 F. Supp. 2d at 26-28.

Knowing that its pricing is not being driven by competition on the supply-side, but solely by what the market will bear on the demand side, the fundamental problem that Microsoft sees in the market is not competing operating systems, but a low cost PC. Since there is no supply-side pressure to lower prices, Microsoft's fundamental problem is that as the total cost of the PC declines, its high prices become a problem.

> We expect <1 k PCs [PCs priced below $1,000] will be bought by consumers and business and could constitute more than 50% of all PCs by C-mass of 1998. In case we see $500 PCs next C-mass our royalties could be as high as 10% of total system prices and if the biz PC markets gets eroded by < 1k PCs we will with an NTW [NT Workstation; now called Windows 2000] solution be in the same position.[114]

Ultimately, the low-end computer is the flash point for resistance to Microsoft's pricing strategy. Microsoft recognizes that its prices make it difficult for OEMs to compete on price.

> We have shown larger than 40% growth rates annually and expect in the future that OEMs will take a very hard look in how to avoid paying us more $$ per system in order to hit most aggressive price points.[115]

The centerpiece of Microsoft's pricing strategy has been to increase operating system prices while other components of the delivered PC bundle have been falling.

> While we have increased our prices over the last 10 years other component prices have come down and continue to come down.[116]

The second memorandum, which explicitly estimates the price of operating systems, confirms this analysis. The average preinstalled price is given as $19 in 1990 and over $49 in 1996.[117] During that time span the average Microsoft revenue for preinstalled software rose from $25 to $62.[118]

Microsoft recognizes that it has been the beneficiary of volume growth created by the falling price of the PC, which masks its increasing prices. Microsoft's increasing average sales price,

114. Government Exhibit #365: Memorandum from Joachim Kempin to Bill Gates, dated Dec. 16, 1997, United States v. Microsoft, 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233).

115. *Id.*

116. *Id.*

117. Government Exhibit #439: PC Value Analysis Cy 1990 – Cy 1996, Mar. 4, 1996, United States v. Microsoft, 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233).

118. *Id.*

combined with increasing sales volume, has fueled its rapid revenue growth.

> OEM division revenue growth over the last 8 years has depended heavily on volume increases and a trend to higher priced OS [Operating Systems]. During that time ASPs [average sales price] have stayed stable or have gone up which made it easier to ride the wave and get the value we deserve.[119]

Thus, one of the key elements in Microsoft's business model is to bury its products in bundles. This hides the price from the public and allows Microsoft to hide behind the declining price of the total package.[120] Microsoft is committed to an operating system with a price of at least $100 and will not contemplate price cuts on the current operating system. Where Microsoft had not yet locked in prices, it would not break the pricing strategy.[121] To implement this pricing strategy, Microsoft helps stimulate shipments of high-end units. Its primary goal is to keep prices high and direct the market to high-end units and high-end Microsoft products with sustainable margins. Microsoft is determined to do everything it can to prevent the market from centering on the low-priced computer. It will not drop its price on operating systems and it intends to push it up. It will

119. Government Exhibit #365: Memorandum from Joachim Kempin to Bill Gates, dated Dec. 16, 1997, United States v. Microsoft, 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233).

120. *Steady Pricing on Operating System Gives Microsoft Healthy Profit Window*, PITTSBURGH POST-GAZETTE, at E-11.

> A paradox of technology is that as product performance goes up, price comes down. Except, that is, in the world of Microsoft Corp.'s Windows operating system. Everywhere else in the computer business, from chips to disk drives, entertainment software, to routers, prices have fallen—often sharply—as companies compete fiercely for market share.
>
> Competitor and industry analysts figure that Windows 95 sells for about $45 per copy to computer makers who buy in quantity. That is the same price or slightly more than the price of its processor. . . .
>
> Compare that with what has happened to the price of an Intel chip. Intel, like Microsoft, is the leader in its market. But, Intel has tougher competition which has been driving down chip prices.
>
> Intel introduced its first Pentium processor in 1993. It has a speed of 60 megahertz, contained 3.1 million transistors and sold for $877 in quantities of 1,000. The Pentium II chip came out in 1997, running at 233 megahertz speed and with 7.5 million transistors, the electronic switches that serve as the building blocks for chips. Pentiums sold for $636 for 1,000 chip blocks are its May introduction. Now the price is $236.

Id.

121. Government Exhibit #365: Memorandum from Joachim Kempin to Bill Gates, dated Dec. 16, 1997, United States v. Microsoft, 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233) ("The answer here has to be 'no' for all people involved.").

offer incentives to OEMs to hold the line, while it seeks to build up the high end of the market. To the extent it has to, it will segment institutional markets, like academia and government, and impose strict pricing discipline. Microsoft will support expansion of the availability of PCs only at the higher end.

While Microsoft recognizes that declining PC prices have become a problem, it identifies a number of factors and strategies that will enable it to double its prices.[122] Microsoft expects that 80 million consumers will be forced to buy new computers to support its new operating systems and that a shorter PC life will also fuel consumer purchases of new systems.[123] It hopes that increasing volume will alleviate the pressures that OEMs are placing on its prices. Microsoft hopes that growing availability of stripped down computers will relieve some of the pressures to lower operating system prices. As the core of the computer becomes cheaper, the demand-side pressures will ease, which will give Microsoft the ability to keep its prices high.

> When comparing system prices over the last couple of years with today's prices we should note that in the low end segment PC manufacturers have started pulling out monitors and other items from their systems. As a result my comparisons is not 100% correct—but this does not change the trend. We have to assume that not all of the <1k PCs will be less powerful or just consumer focused. Many will be less capable as OEMs strip peripherals. We are making this easy with USB, 1394, device bay etc. Easy transfer of peripherals to new PCs could be the result and the vanilla core architecture might get artificially even cheaper. At least this would make it easier for us to defend our pricing as we increase our BOM percentage.[124]

This description of market dynamics reveals a great deal about Microsoft's view of the low end of the market. Note that Microsoft acknowledges the stripped down computer to be "consumer focused." It considers the plain vanilla core to be "artificially cheap." Supply-side pressures are forcing OEMs to cut their prices and accept only competitive returns. This is not how Microsoft behaves. Because it does not face such pressure it sees declining costs for other components as a chance to maintain and increase its own prices. Above all, it is determined to resist attempts to force it to lower its price.

122. *Id.*
123. *Id.*
124. *Id.*

It considers changes in the structure (not level) of pricing to protect its revenue. Price discrimination by computer system type is rejected because Microsoft loses control.[125] Product differentiation by reducing the value of the basic operating system and then selling additional packages is more attractive.

> This is a viable option if we can make the add-on pack a stunning piece of technology and a "must have" for every PC owner. Performance, management and ease of use features come into my mind. Again we need to start on this now in order to be ready at NT 6.0 time frame.[126]

This passage from Microsoft's memo is remarkable on two counts. First, it is particularly ironic to consider that in order to defend its pricing strategy Microsoft considers breaking apart the operating system bundle, which it otherwise claims must be kept together to preserve a uniform experience. In three sentences, Microsoft has debunked the essence of its defense to the unlawful tying allegation in the antitrust case. Second, this quotation illustrates that Microsoft's all consuming objective is keeping prices high at consumers' expense.

In fact, the whole argument of pulling out peripherals, shrinking down machines and reducing the preinstalled operating system content supports a fundamental consumer conclusion: the PC has developed to the point where it can be customized to much more effectively meet consumer needs. The PC is becoming commoditized.

The memo then offers the following observation on an important factor that contradicts these forces for increased demand: *Consumers do not actually need to upgrade their computers.*

> The only counter argument to make here is that current PC technology is totally sufficient for most office tasks and consumer desires and that any performance bottleneck is not in today's PCs but in today's COM [communications] pipes. This in itself might slow down replacement cycles and life time shortening until we find

125. *Id.*

> Both methods are an administrative nightmare for the OEMs and us. This worked when we had only 3 CPU types and the one with the higher royalty had a long cycle time—today we have too many types (I can just hear Intel calling me feeling we treat them unfairly by putting all their competitors into the low end bucket) and the cycle times are so unpredictable that we recommend against this. We have priced once on manufacturer cost and it is a sure way to totally erode your model without having any control. We rejected this as well.

Id.

126. *Id.*

> true MIPS [millions of instructions per second] eating applications—a priority not only INTEL should subscribe to.[127]

Microsoft's problem is simple. Consumers do not need high-end operating systems and the expensive machines necessary to run them. Low-cost PCs will expand the market, but will not support Microsoft's goals for revenue growth. Microsoft's answer is to render the existing base and new low-cost machines obsolete so it can sell high-end products at a greater margin.

B. Pricing Patterns

The harm to consumers resulting from Microsoft's anti-competitive and abusive business practices is most clearly evidenced in the terms and prices at which Microsoft sells operating systems to original equipment manufactures (OEMs). These terms and prices establish the baseline for how much consumers ultimately pay. Microsoft and its defenders claim that the price has been low and stable over the 1990s.[128] Some of its defenders go so far as to claim that the price of the operating system has fallen. [129] However, two internal Microsoft memoranda on the pricing of operating systems flatly contradict these claims.[130]

Historic pricing and strategic pricing plans demonstrate that operating system prices increased dramatically in the 1990s after Microsoft gained monopoly control over the operating system market (see Exhibit IV-1). This reversed strong trends established during the 1980s towards declining prices and improving quality.

The internal Microsoft analysis shows that the price of the operating system increased by almost 160% between 1990 and 1996. That is an annual increase of 17%. In contrast, between 1981, when the operating system was introduced, and 1990, when the last significant competitor was driven from the PC operating system

127. *Id.*

128. *See* LIEBOWITZ & MARGOLIS, LOSERS, *supra* note 12, at 154-57.

129. *See* Stan J. Liebowitz, *A Defective Product: Consumer Groups' Study of Microsoft Pricing in Need of Recall*, COMPETITIVE ENTERPRISE INSTITUTION, Feb. 9, 1999, *at* http://www.cei.org/OnPointReader.asp?ID=603. Liebowitz analyzes the street price, not the preloaded prices of DOS/Windows, although the vast majority of operating system sales that Microsoft makes are made preloaded. *Id.*

130. Government Exhibit #365: Memorandum from Joachim Kempin to Bill Gates, dated Dec. 16, 1997, United States v. Microsoft, 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233); Government Exhibit #439: PC Value Analysis Cy 1990 – Cy 1996, Mar. 4, 1996, United States v. Microsoft, 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233).

market, the price of the operating system fell from $40 to $19.[131] That is an annual decline of 8% per year.

Not only are the claims of stable, low, and falling prices contradicted by the analysis of preloaded, wholesale prices, but retail price data presented by some Microsoft experts show that the street price has increased as well.[132] Elzinga and Mills, who cite a publicly available and consistent source for their data, show a 30% increase in the street price of the operating system—Windows including DOS.[133]

Microsoft and its defenders point to quality improvements as justification for the dramatic price increases of the 1990s.[134] Yet, the 1980s witnessed dramatic improvements in quality and prices fell nonetheless. Because of economies of scale achieved from expanding production and advances in software engineering, a competitive software market produced dramatic increases in quality and dramatically declining prices. It is the monopoly, not quality improvements, that produced rising prices in the 1990s.

This pricing also contradicts other important claims by Microsoft's defenders about pricing. *Losers* makes sweeping comparisons between prices in the early and mid-1980s and prices in the mid to late 1990s. It claims dramatically declining prices in those markets where Microsoft offers a product.[135] The analysis never considers the price of the operating system. Nor are concerns about pricing limited to operating systems. Using the leverage of the operating system monopoly, Microsoft went after the word processing and spreadsheet markets. Using similar tactics as are being litigated in the web browser case—bundling and impairing the ability of competitors to work with Windows—Microsoft captured market share equaling its operating system monopoly. A senior executive of Microsoft, pointing to the successful bundling strategy in the desktop market as a model for the browser wars, observed that Office is expensive.[136]

When this statement was made, prices were actually declining (a fact that Microsoft defenders harp on), yet this executive knew the

131. Evans et al., *supra* note 11.

132. Leibowitz, *supra* note 129, at 2. Liebowitz claims an 18% price reduction for Windows from 1990 to 1998 based on unavailable proprietary sources. *Id.*

133. Elzinga & Mills, *supra* note 11, at 51.

134. *See* Report of Direct Testimony of Richard Schmalensee, United States v. Microsoft Corp., 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233); *see also* Leibowitz, *supra* note 129, at 2. Both Schmalensee and Liebowitz mention the investment in quality improvement.

135. LIEBOWITZ & MARGOLIS, LOSERS, *supra* note 12, 156-57.

136. United States v. Microsoft Corp., 84 F. Supp. 2d 30, 41 (D.D.C. 2000).

product was expensive. The explanation is well known. Two massive changes took place in the software market during this period to dramatically lower costs that cannot be attributed to Microsoft. First, marketing of software shifted from retail sales to wholesale (preinstallation), which dramatically reduced distribution costs. Second, the quantities of PCs shipped increased from a few million per year to well over a hundred million, which dramatically lowered average costs. Moreover, as we have seen, Microsoft prevented competing programs from being pre-installed.

> While there *are* new functions in Windows, the unit costs are spread over unit volumes that have increased dramatically, and that continue to increase perhaps 25 percent per year. Microsoft's average costs in marketing, distribution, and sales have also declined sharply. The steady increase in its unit volumes, the conversion from floppy discs to inexpensive CD-ROMs, and the shift toward PC preloading, Internet-based distribution, and high-volume corporate licensing agreements have all been driving down unit costs and driving up margins, for both Windows and Office. In fact, Microsoft profits have consistently increased much faster than its revenue over the last decade.[137]

Microsoft enjoyed the benefits of these cost reductions, but because it did not face sufficient competition, it did not pass the cost reduction through to the public. That is the sense in which it was expensive. Microsoft is actually a high-priced seller, compared to its costs, not a low-priced one. To use Microsoft's own phrase uncovered in evidence at the trial, it "rides the wave" of increasing sales of PCs and declining PC prices to keep its prices high. By comparing old apples to new oranges, the analysis presented by Microsoft's defenders has reached the wrong conclusion about Microsoft's impact in the market.[138]

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137. CHARLES H. FERGUSON, HIGH ST@KES NO PRISONERS: A WINNER'S TALE OF GREED AND GLORY IN THE INTERNET WARS 309 (Three Rivers Press ed., 1999).

138. LIEBOWITZ & MARGOLIS, LOSERS, *supra* note 12, at 154-57. Other price analyses in *Losers* are also flawed. The price of software categories in which Microsoft does not compete did not go down because there were high end, niche markets which were not subject to the economic forces we have identified in the mass, desktop market. These highly specialized programs are not amenable to pre-installation, since they are so specialized. They do not exhibit the large economies of scale because they are not mass market items.

The prices of applications that compete with Windows go down because Microsoft has bundled these with the operating system. This category is made up of utilities and communications applications, which Microsoft does not sell on a stand-alone basis. We could argue that the increase in the price of the operating system (150% over the period) was caused in part by this bundling.

It appears that Microsoft is selling suites in the range of $125 to $190 preloaded. The competitors sell suites at less than $15 preinstalled.[139] The premium is well over $100 and appears to have gotten larger, primarily because the competitors have dropped their price in an effort to stem the loss of market share.[140]

C. Estimates of Monopoly Abuse

We are concerned about market power because of the harm it does to consumers by increasing prices above competitive levels.[141] Antitrust practice considers even fairly small pricing abuse—as low as 5%—to be a source of concern if the aggregate amount of abuse is large.[142] Expert witnesses for Microsoft (Richard Schmalensee[143])

Losers argues that Microsoft should have charged more for Word for the Mac when it had a larger market share. This fails to consider key market factors that we have pointed out. It can be argued that Microsoft charged the maximum that the market will bear as determined by the market power of other component manufacturers and the elasticity of demand. In the Mac market, Mac itself has much greater market power than Microsoft and the elasticity of demand is too high.

139. Joel Brinkley, *Microsoft Has a Stronghold in Office Suites*, N.Y. TIMES, May 27, 1998, at D1-2.

> They can buy individual copies of the program for installation on some computers at a price of roughly $170 to $190. Or, they can buy the program at a far lower price, roughly $125, if they purchase it for installation on every computer in a company line....
>
> As it is, Corel has changed its marketing strategy. "It's clear to us that Microsoft isn't our competition anymore," he said. "They are our environment, and we need to deal with that fact by making our product completely compatible with Microsoft Office so users can move files back and forth between their programs and ours.

Id.

140. A review from a November 1996 *PC Magazine* noted the very attractive price/quality offer being made by Microsoft's competitors. *PC Magazine* wrote the following:

> Microsoft's approximately 85 percent revenue share of the suite market has had at least one side effect: Lotus and Corel seem willing to cut prices and offer more just to grab your attention. In addition to the incredibly low upgrade price for Corel's WordPerfect Suite, the huge number of applications in its Office Professional will make you do a double take. And, with the SmartSuite upgrade's very competitive price, Lotus is getting into the act, too. Both companies seem to be reconciled to the role of "spoiler," forcing Microsoft to drop prices or sacrifice market share.
>
> In the ensuing two years, not only did Microsoft not match the price challenge, but also it increased its market share.

PC MAG., Nov. 19, 1998, at 105 (comparing Microsoft Office with its two largest competitors).

141. SCHERER & ROSS, *supra* note 15, at 70-71.

142. Roger D. Blair & Amanda Esquibel, *Some Remarks on Monopoly Leverage*, 40 ANTITRUST BULL. 371, 392 (1995) (citing William M. Landes & Richard A.

and the Government (Franklin Fisher[144]) devoted considerable attention to the question of the monopoly price of operating systems. An *amicus* brief by Litan and Noll took up the issue, as well.[145]

Robert Litan, Roger Noll, and William Nordhaus estimate that Microsoft's return on invested capital and research and development was 88% for the fiscal year ending 1999.

> Over the period 1990-98, post-tax rate of profit of U.S corporations averaged 6.7 percent per year. Using published numbers from Microsoft's financial statements, we estimate that in 1999 Microsoft's post-tax rate of profit was 88 percent. *In other words, Microsoft's rate of profit on its investment is currently more than thirteen times the average rate of profits of major U.S. corporations.* This is most impressive economic demonstration of the economic returns to monopoly that we have ever seen in a major antitrust case[146]

The implications of this analysis are staggering. If Microsoft had earned an average rate of return, its profit over the four year period, 1996-1999, would have been between $16 and $20 billion less. Keeping in mind that this is after tax dollars, the implicit excess charges to the public would be between $25 and $30 billion. This is a huge sum of excess profits.

Posner, *Market Power in Antitrust Cases*, 94 HARV. L. REV. 937 (1981)) (giving an example using 10%).

143. Report of Direct Testimony of Richard Schmalensee, United States v. Microsoft Corp., 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233).

144. Rebuttal Testimony of Franklin Fisher taken on June 1 and 2, 1999, United States v. Microsoft, 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233).

145. Remedies Brief of Amici Curiae, United States v. Microsoft, 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233).

> The liability phase of the case contained a discussion of profit margins. These are not the appropriate concept for measuring monopoly profits. In competitive markets, the profit rate on investments will tend to be the opportunity cost of capital (with appropriate adjustments for differences in risk, inflation, and taxes). If a monopoly earns supranormal profits, that will be seen its rate of profits.
>
> The profit margin is equal to the rate of profit on investment times the ratio of investments to sales. The investment-sales ratio is essentially a nuisance parameter that confuses the calculation and has no particular relationship to the exercise of market or monopoly power.
>
> Therefore, in order to measure whether a monopolist has been successful in earning monopoly profits, the appropriate analytical concept it the rate of return on investment and not the profit margin.

Id.

146. *Id.* at 65.

(1) Defining and Measuring the Problem of Market Power over Price: The Lerner Index

Market power allows a firm to set price above marginal cost and achieve above-normal profits.[147] The Lerner index (L) measures the mark-up above cost resulting from market power.[148] The Lerner Index represents the ratio of the monopoly overcharge (P - MC) divided by the total price (P).

$$L = \frac{P - MC}{P}$$

The total value of the overcharge is derived by multiplying the per unit overcharge times the total number of units sold.

There are generally uncertainties about the cost data and, given Microsoft's extreme secrecy about pricing, there is even debate about price data, which is usually readily observable in the market. Therefore, economists frequently consider several other measures of monopoly profits that are the aggregate manifestation or the result of the underlying pricing abuse.

> A good long-run approximation to the Lerner index is the ratio of supra-normal profits to normal cost. This is approximated by the ratio:
>
> $$\Pi_S = \frac{\text{Supra-normal profit}}{\text{Sales revenue}}$$
>
> where supra-normal profit = sales revenue—noncapital costs—depreciation—(total capital x competitive cost per unit of capital).[149]

The profit margin identified above is the abnormal profit margin earned by the monopolist. While profit margins are readily available, they present some problems.

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147. SCHERER & ROSS, *supra* note 15, at 70-71.

148. *Id.*

> Its merit is that it reflects the allocatively inefficient departure of price from marginal cost associated with monopoly. Under pure competition, M=0. The more a firm's pricing departs from the competitive norm, the higher its associated Lerner Index value. A related performance-oriented approach focuses on some measure of the net profits realized by firms or industries

Id.

149. *Id.* at 415-16.

Because the cost of capital is not recorded in firms' accounting statements and can only be imputed with difficulty, few researchers have developed accounting-based estimates of Π_S. Economists seeking to avoid this difficulty have usually opted for second-best surrogates falling into three categories.

One is the accounting rate of return on stockholders' equity:

$$\Pi_E = \frac{\text{Accounting profits to stockholders}}{\text{Book value of stockholders equity}}$$

Or on capital:

$$\Pi_C = \frac{\text{Accounting profits + interest payments}}{\text{Total Assets}}$$ [150]

Litan, Noll, and Nordhaus use the latter measure and compare Microsoft's performance to that of all nonfinancial corporations to derive their estimates of astronomical profits. Estimates of profitability based on the prior two measures and applied to a set of companies chosen to be more comparable support their conclusion.

(2) Empirical Estimates

Ideally, we would observe the price in the marketplace, estimate the cost, and calculate the index directly. Obtaining data, however, is always a problem. Historical price behavior indicates a direct correlation between competition and lower prices (See Exhibit IV-2).[151] Eliminating competition results in prices being higher than they

150. *Id.* at 416.

151. ROHM, *supra* note 63, at 85, 263-64.

> DR-DOS had Gates going ballistic when it came out with DR-DOS 5.0 in April 1990, and now only months later his sales team was locking computer makers into contracts for Microsoft's version of the product, which it had publicly stated would appear also in 1990 [It would not appear until June 1991] ....
>
> Meanwhile, in e-mail after e-mail, Gates had complained to Ballmer that DR-DOS had made it impossible for him to keep prices high. How could he continue to be profitable with DR-DOS around?
>
> A few weeks earlier Susman had deposed Gates while Palumbo had deposed Brad Chase. Microsoft's counsel Steve Holly had been present. Susman had confronted Gates with an e-mail message to Steve Ballmer in which Gates had railed on about the fact that DR-DOS was cutting into his ability to keep prices for MS-DOS high.

Rohm notes similar potential with respect to applications.

> Gates then went on to itemize the key impacts of Novell's move on each area of his business. His concern was how the merged company would impact

should. Under a worst-case scenario from a consumer perspective, the price of operating systems should have remained flat throughout the 1990s. A modest, 3% decline in prices could have been expected. We estimate a competitive price for operating systems in the range of $15-$25. We observe a price in the range of $50 to $60. Monopoly overcharges are in the range of $35-$45. Based on this estimate, the operating system is marked-up between 100 and 200%.

To calculate the total overcharges, we multiply by the number of units sold. With approximately 260 million units sold, and taking taxes into account, we estimate overcharges in the range of $12.6 to $16.2 billion. This is based on operating system sales only. The Litan et al. estimate of $25 to $30 billion would include excess from other lines of business, applications in particular.

For the purposes of estimating monopoly profits we consider five categories of companies for comparison (see Exhibit IV-3): (1) the entire computer industry; its three subgroups: (2) computer hardware and peripherals, (3) computer software, (4) semiconductors; and (5) all U.S. industry. In all comparisons, the non-Microsoft comparisons exclude Microsoft and Intel. We look at the overall industry since Microsoft has tried to claim that all elements of the computer industry are potential competitors.

Microsoft's return on equity (ROE) is much higher than that of companies in the comparison groups. It has had an ROE over 30% for the past three years and has maintained close to a 30% ROE for a decade. This return on equity is approximately twice as high as that of the industry as a whole, almost twice that earned by other software firms, and two to three times the national average.

Microsoft's profit margin is also extraordinarily high and has increased in recent years. In 1999, Microsoft had a profit margin of about 41%. This margin was about six times higher than those of the software and services sector and the hardware sector, and

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Microsoft Office, Microsoft's office productivity suite, fretting that Novell could turn its own office suite into "a serious contender which could force price and volume cuts in our office business."

Id. at 183. "By 1994, after DR-DOS was pretty much dead, Microsoft had doubled the price of DOS. There was no alternative on the market. Like a classic monopolist, once it had eliminated competition, prices soared." *Id.* at 80; *see also* Amy Cortese, *Windows: What's the Real Cost*, BUS. WK., Oct. 19, 1998, at 46; Neil Gandal, *Hedonic Price Indexes for Spreadsheets and an Empirical Test for Network Externalities*, 25 RAND J. ECON. 160, 160-70 (1994); *see generally* Erik Brynjolfson, *The Productivity Paradox*, COMM. ASS'N COMPUTING MACH., Dec. 1993.

approximately seven times the national average.[152] These extraordinary profit margins are attainable because the lack of competition allows Microsoft to maintain high prices. As a result, Microsoft pockets all of the benefits of economies of scale and scope. These benefits are not passed on to the public. Total returns to investors reflect these extremely high profit margins. Microsoft has yielded a total return to investors almost three times the national average in the decade prior to the antitrust case and 50% above the industry average.[153] Based on the profitability analysis, we arrive at a range of estimated overcharges of $10 to $20 billion.

(3) Elasticities

Because of the lack of cost data and concerns about price and profit data, economists frequently transform the price/cost analyses into other economic measures for which they have data or which they can estimate. Economists on both sides of the case have used estimates of demand elasticity to evaluate whether Microsoft has abused its monopoly power. The price cost margin can be converted to the reciprocal of the elasticity of elasticity of demand.

$$L = \frac{P - MC}{P} = \frac{1}{E}$$

Microsoft experts, inside and outside of the courtroom, applied two variants of this formula. Rather than calculate the mark-up above cost, first they estimated the monopoly price that would be charged, given the elasticity of demand.

152. *The New Microsoft*, FORTUNE, Feb. 14, 2000, at 90. A recent analysis in Fortune makes the general point in this section in stark terms. It presented Microsoft's revenues and profits broken down by divisions.

- The platforms group was attributed a profit margin of 90%. It included the operating system and is the clearest case of monopoly power.
- The remainder of the company had a profit margin of about 17%.
- This is a widely held view of the profitability of the various lines of business.

The developer groups were defined as products and services for programmers, which is clearly an area where Microsoft exercises market power since programmers are dependent on access to the operating system. It had a profit margin of 30%. The business applications group included desk top applications, where competition has been dramatically reduced in recent years, and back office server software, where competition is vigorous. It had a profit margin of 24%. The Consumer group (basically internet and cable TV products) had a net loss of 20%. The abnormal profits in operating systems and the more normal profits in other divisions reflects the market power being exercised by Microsoft. *Id.*

153. *See generally Fortune 500*, FORTUNE, Apr. 28, 1998.

$P_o = C_c / E_c - 1$

where:

P_o = Price of the operating system charged to the OEM

C_c = Competitive price of computers

E_c = Price elasticity of computers

They then took a second approach in which they included revenues from sales of complementary products, like office suites.

$P_o = C_c - R*E_c / E_c - 1$

where:

P_o = Price of the operating system charged to the OEM

C_c = Competitive price of computers

E_c = Price elasticity of computers

R = Revenue from complementary products

Schmalensee estimates market power using the Lerner Index, with and without complementary revenues (see Exhibit IV-4). He assumes that, for 1997, Microsoft is a lone monopolist charging $50 per operating system. It faces demand elasticity of 2. It has complementary net revenues from other software products sold for each computer of $100 per computer. Computers cost $2,000. Under these assumptions, he concludes that the profit-maximizing price for the operating system would be $1750. Since Microsoft actually charges only $50, Schmalensee asks, "Why Does Microsoft Charge So Little for Windows?" He concludes that the explanation is that Microsoft is not abusing its monopoly power.[154]

Fisher assumes the following for 1999. Microsoft is a lone monopolist charging $65 per operating system. It faces demand elasticity of 4. It has complementary net revenues from other software products sold for each computer of $160 per computer. Computers cost $1,000. Under these assumptions he concludes that the profit-maximizing price for the operating system would be about $100. Since Microsoft actually charges $65, Fisher shows that Microsoft is capturing a large part of the monopoly rents.[155] Fisher's analysis is much more compelling, conceptually and empirically.

First, as he notes, the antitrust issue is not whether the monopolist maximizes its profits at any moment in time, but whether

154. Report of Direct Testimony of Richard Schmalensee, United States v. Microsoft Corp., 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233).

155. Rebuttal Testimony of Franklin Fisher taken on June 1 and 2, 1999, United States v. Microsoft, 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233).

it abuses its market power.[156] The court notes that Microsoft engaged in behavior to increase both short term and long term monopoly power.[157] The antitrust issue is whether the monopolist raises prices sufficiently above the competitive level to impose significant harm on the public.[158]

Second, a close look at the empirical evidence in the case, particularly Microsoft's own internal pricing strategy memoranda, shows that Fisher's analysis is much better supported by the facts. The empirical data in a Microsoft pricing memo shows linear price elasticity of about 4.[159] That is, a 1% decline in the price of computers was associated with a 4% increase in sales of preloaded operating systems. This is much larger than the highest level assumed by Schmalensee in his analysis.[160] Microsoft's complementary revenue per preloaded operating system is $5 for every $1 of preloaded revenue.[161] Its gross profit margin (pretax) is about 60%.[162] Therefore, its complementary net revenue is closer to $150 than $100.

The evidence at the trial suggests that another consideration must be added—a consideration that Microsoft takes into account in its own pricing strategy—the behavior of Intel. Intel is a "partner"—

156. *Id.*

157. *Id.*

158. Blair & Esquibel, *supra* note 142, at 392.

159. *PC Value Analysis* shows in the monopoly period—1991 to 1996—an elasticity of 4.55. More recent years show higher elasticities. Including 1990 lowers the price elasticity to 3.1. While it may be preferable to calculate elasticities based on more sophisticated data and models, this basic data is before the court as evidence. Government Exhibit #439: PC Value Analysis Cy 1990 – Cy 1996, Mar. 4, 1996, United States v. Microsoft, 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233).

160. Report of Direct Testimony of Richard Schmalensee, United States v. Microsoft Corp., 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233). Schmalensee's assumption that the elasticity of demand for PCs represents the elasticity of demand for an intermediate component, such as the operating system, which is a small, but growing part of the total price, can be debated, as well. For the purposes of rebuttal Fisher accepted the assumption, as does this analysis.

161. Government Exhibit #439: PC Value Analysis Cy 1990 – Cy 1996, Mar. 4, 1996, United States v. Microsoft, 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233). The Value Memo shows that in 1996 Microsoft sold approximately 50 million preloaded units at approximately $50 per unit, for total revenue of $2.5 billion. Its 1996 total revenues were $15 billion. Thus, it earned $5 of other revenue for each $1 of preloaded revenues.

162. Reddy et al., *supra* note 11, at 11-12. Reddy et al. assume net revenues are 67% of sales. This is a higher margin than observed in the data although it could be justified by arguing that complementary sales have lower marginal costs than the overall operations of the company. Because we have treated all revenues as complementary, it is more appropriate to use the company-wide net profit margin.

a joint monopolist—with Microsoft.[163] Microsoft compares its share in the total PC price to that of Intel. It worries about Intel trying to capture its margins and plots how to defend them. As Kempin noted, the operating system software and the CPU are intertwined, just as Microsoft and Intel are intertwined.[164]

Microsoft notes that Intel's pricing power has declined as a result of competition from other chip manufacturers, while Microsoft's pricing power in the operating system market has not.[165] Microsoft identifies two market segments in the chip market—a high priced segment and a low priced segment. Microsoft documents show that in 1996 the joint monopolists were charging a price of $286 per computer for their combined products.[166]

If we plug these observations into the formula used by Schmalensee and Fisher (as in Exhibit IV-4), we find that Microsoft has, in fact, charged prices that capture the vast majority of the monopoly rents available. In 1996, it was capturing over three-quarters of these profits, and today it is capturing virtually all of them

This analysis also explains why Microsoft is so concerned about the declining price of computers. As this price declines, Microsoft's ability to defend and expand its margins is inhibited. The Kempin Memo outlines Microsoft's strategy not only for keeping operating system prices up, but also for doubling them over the next few years.

Microsoft's experts undertake another statistical analysis.[167] They attempt to show that Microsoft acts like it faces a high elasticity of demand by deriving the market elasticity for the assumed pricing behavior.[168] Dividing the market price of the PC by the total revenue assumed per computer yields a high elasticity of 13 ($2000/$150 = 13). This is much higher than the observed market elasticity.

The assumptions derived from the Microsoft memos are much more reasonable since they yield an estimated elasticity of 4.59

163. Government Exhibit #365: Memorandum from Joachim Kempin to Bill Gates, dated Dec. 16, 1997, United States v. Microsoft, 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233).

164. *Id.*

165. *Id.*

166. Government Exhibit #439: PC Value Analysis Cy 1990 – Cy 1996, Mar. 4, 1996, United States v. Microsoft, 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233).

167. Reddy et al., *supra* note 11, at 3-4.

168. *Id.*

($2000/[286+150] = 4.59).[169] This is exactly the price elasticity observed in the 1991-1996 data, the period of the monopoly. If a price elasticity of 4.5 were used in the analysis summarized in Exhibit IV-4, the estimated monopoly price would be $296. This indicates that the Wintel monopoly is capturing 97% of the available economic rents.

D. Business Case Evidence Before the Court on Monopoly Power and the Benefits of Competition

The second pricing memorandum also provides insight into nature of monopoly rents being collected and the powerful effect that breaking a monopoly can have (see Exhibit IV-5).[170] The memorandum claims that Intel's CPU price increased over the 1990-1996 period. On a percentage basis, it did not increase as much as Microsoft's, but the increases were substantial, just over 100%. If competition were to break out, prices would tumble for both CPU and OS.

In fact, Microsoft notes that competition has picked up in the CPU market.

> This is particularly true for CPU prices, where AMD and CYRIX are clearly under $50/unit components with packaging COG [Cost of Goods] of $20-$25. Intel has higher costs today because of their packaging and I estimate that their current average CPU price is around $170-$180 with $40-$60 in packaging costs (so the money they are getting for their IP on silicon is $120-$140 in average, which compared with NTW prices being between $100 and $120 typically). I am interested in listening to them when they explain to us their low-end strategy in Dec.[171]

In other words, competitors are bringing CPUs to market for less than half of what Intel gets for its intellectual property (IP). Microsoft has a target price of between $100 and $120 for its operating software. Although Intel is having trouble defending its monopoly rents in the face of cost cutting competition, the target for Wintel is $270 for CPU+OS.

169. Government Exhibit #439: PC Value Analysis Cy 1990 – Cy 1996, Mar. 4, 1996, United States v. Microsoft, 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233).

170. *Id.*

171. Government Exhibit #365: Memorandum from Joachim Kempin to Bill Gates, dated Dec. 16, 1997, United States v. Microsoft, 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233).

Microsoft contemplates competition breaking out in one of two ways. Intel could bolt OS onto its CPU, squeezing out the rents from OS, but preserving its rents on CPU. Since Intel's costs were put in the $170 to $180 range, the implicit cost of a start-up operating system is in the range of $20 to $30. This is quite consistent with our conclusion that the cost of Microsoft's ongoing operating system is in the range of $15 to $25. If Intel were to take this strategy, it would squeeze out Microsoft's rents and lower the price of CPU+OS by $70 to $100.

Alternatively, Microsoft could bundle CPU with its OS, squeezing out CPU rents, but protecting its OS rents. Assuming the startup costs about $70 to $75, as previously estimated by Microsoft, it could bring the bundle to market at $170. This strategy would lower the cost of CPU + OS by $100 to $125.

Competition is "ugly" to Microsoft, but if full component competition were to break out across both the products, consumers would achieve savings of almost $200. The resulting squeeze would push the profits of both companies down to reasonable levels. Implicitly, in this analysis, Microsoft's margins are about twice as large as Intel's. If these rents were squeezed out, each of the firms would see its profit margins reduced to just slightly over the average for the rest of the computer industry.

E. Indirect Consumer Harm

There are a series of additional interrelated effects of the Microsoft monopoly that must be considered in assessing the harm it imposes on the public—severe negative effects on innovation in the industry and indirect costs imposed on consumers.

Stifling Innovation by Chilling Investment in Products That Might Compete with Microsoft's Core Products: The court noted that the repeated pattern of anti-competitive actions has a chilling effect on the companies that would enter the Intel-based PC market.

Delaying and Preventing the Development of Products: The court noted at least six instances in which Microsoft sought to delay the development of competing products. It noted several instances in which it delayed the delivery of its own products to accomplish an anti-competitive outcome.

Denying Consumers Alternatives That Would Better Suit Their Needs: Microsoft imposed strict discipline on companies shipping Windows to prevent them from altering the configuration of Windows and related icons. The court was struck by the extent to which

Microsoft was willing to inconvenience consumers to preserve its hold on the market and the inconvenience created by Microsoft's steadfast control of the boot screen. The court took special note of the fact that the OEMs were the ones who actually dealt with the public and they perceived a significant problem in Microsoft's refusal to allow modification of the boot screen. The costs they perceived were substantial.

Denying or Delaying the Introduction of Non-Microsoft Products: By denying or delaying the introduction of non-Microsoft products, Microsoft restricts consumer choice. These tactics were not restricted to the browser. There was a broad range of products that Microsoft slowed or prevented from getting to market.

Forcing Consumers to Buy Non-Microsoft Products in Inconvenient Ways: By foreclosing the primary channels of distribution with exclusive contracts and other deals, Microsoft forces consumers of non-Microsoft products to acquire them in time-consuming and inconvenient ways.

Undermining Compatibility: There were also several instances in which Microsoft undermined the ability of software applications or middleware to function properly with the operating system.

Impairing the Functionality of Microsoft Products to Defend Its Own Monopoly: Microsoft was quite willing to undermine the quality of its own and of competing products to preserve its market dominance.

Forced Upgrades and Additional Support Costs: With no competition, Microsoft upgrades, which are sold to the public, become extremely high margin products.[172] Microsoft is able to sell excessive functionality.[173] Consumers pay for more functionalities

172. Steve Lohr, *Where Microsoft Wants to Go Today*, N.Y. TIMES, June 5, 1998, at D-1 ("David Rearderman, an analyst at Nationsbanc Montgomery Securities, estimates that operating system revenues in 1997 were $4.6 billion and produced gross profit margins of 90 percent."); *see also* Denise Caruso, *Nimbly, Microsoft Has Taken Advantage of Ignorance to Reshape the World*, N.Y. TIMES, Dec. 1, 1997, at D-4 ("In contrast to product-development cycles in old-style manufacturing businesses, like automaking, extensive changes to an operating system—and the subsequent upgrades they force throughout the chain—require no costly retooling of assembly lines and no new raw materials. The main cost is human capital—some months of programmers' time.").

173. *See* Caruso, *supra* note 172.

> And Microsoft has taken brilliant advantage of that ignorance. Many people, for example, do not understand how Microsoft's business works or how it has come to dominate the software industry.
>
> The key to Microsoft's success is its strategy of linking its Windows operating systems—the foundation of a PC's operations—to its productivity applications, to

bundled into packages of software than they should and they are forced to buy bigger machines.[174] Because Microsoft does not face competition, it is does not face pressures to provide high quality products and the public is forced to purchase systems that are much buggier than they should be.

Microsoft drives a rapid product cycle[175] with inefficient software that requires bloated hardware.[176] Furgeson sums up linking the lack

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the Internet, to its consumer products, to its programming tools and to hardware manufactures in a tight, interdependent chain.

Whenever it makes a significant modification to Windows—as it did in the step from Windows 3.1 to Windows 95, for example—everything in the chain has to change, too....

Customers are caught in the competitive spiral, being constantly pressured to upgrade "obsolete" software—though the definition of obsolescence is debatable.

Id.

174. Gleick, *supra* note 72, at 83.

Anecdotally, it is clear that millions of high-end users have bought the upgrade but that millions of corporate customers have chosen to delay the inevitable heartache, particularly when most existing hardware lacks the speed and memory to run it well. It does not matter. In the long run virtually every desktop computer will run Windows 95 and its successors. New computers shipping now have Windows 95 preinstalled by default. Applications developers have either stopped developing for DOS and Windows 3.1 or soon will.

Id.

175. FERGUSON, *supra* note 137, at 309-10.

Microsoft also uses another technique, the forced upgrade cycling of its installed base, which increases its revenues but imposes huge costs on consumers by forcing them to replace their hardware more frequently than necessary. Clearly, the rapid progress of computer hardware technology helps ease the pain of the high rate of obsolescence Microsoft creates, but there is considerable pain nonetheless. The pace of updates and sheer number of new features results in the often bug-ridden bloatware that consumers and businesses are forced into accepting.

With each new round of updates, Microsoft generally discontinues or at least deemphasizes sales and support for older versions.... The introduction of backward incompatible new features, even if each feature is used by only a small percentage of users, will quickly result in a high fraction of new documents being unreadable by older versions of the application. The whole user base is therefore forced into a kind of perpetual motion machine of rapid version updating....

This forced version cycle imposes enormous costs on users that are probably beginning to approach, or even exceed, the size of the benefits discussed earlier. First, users must buy new hardware more frequently. Even larger, however, are the increased installation, service and maintenance costs imposed by this regime.

Id.

176. *Id.* at 310.

Since there is rapid technological progress in semiconductors, plus genuine competition in the hardware sector, PC costs have been flat to falling. Recently, direct and Internet retailing have further reduced manufacturing and distribution costs to extraordinarily low levels. As a result Microsoft has been able to pursue

of innovation with the distortion of the competitive process to consumer harm.

> Furthermore, too much Microsoft software is just *bad.* With some justice, Microsoft can argue that it faces unique challenges—a huge number of users running a very large number of slightly different hardware platforms in an industry with an unusually high rate of technical change. But Cisco routers have most of those characteristics, and they work much better. It is also noteworthy how often freeware outperforms Microsoft's commercial products....
>
> Microsoft's position as the monopolist purveyor of mediocre software is another source of large, and unnecessary, social costs. Training and recovery from software errors and crashes are, along with rapid version cycling, major contributors to service costs.... Conservative estimates are that the cost of maintaining a desktop is several times higher than the cost of purchasing it. Cleaner, simpler, better-designed software could reduce these overhead costs, thereby freeing large numbers of technologists to do useful work.[177]
>
> The generally accepted rule of thumb is that corporations spend three to five times their hardware costs on service. New hardware and software products must be installed, debugged and then serviced; employees must be taught how to use them. These costs increase greatly with the novelty and heterogeneity of systems in use; hence the more upgrade cycling, the higher these costs.
>
> Finally, there is Microsoft's effect upon potential and actual innovation. It is abundantly clear that any new entrant who creates a large market or a threat to Microsoft's monopoly platform position will be the object of a brutally effective, often predatory retaliation in which Microsoft will use every unfair advantage it possesses.[178]

Precise estimates of indirect costs such as these are always difficult to make. Ferguson's discussion suggests that hundreds of billions of dollars of consumer savings would result from a restoration

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its strategy without causing unacceptable increases in hardware prices. Nonetheless, even $599 PCs are probably $100 more expansive than they would be if Microsoft wrote products more carefully and without artificial feature increases. More important, people would not need to replace their computers as frequently or spend as much money servicing them. These costs affect everyone, but they probably affect poor people and the developing world more than the average business user.

Id.

177. *Id.* at 311.

178. *Id.*

of competitive processes in the industry. The reduction in direct costs resulting from the elimination of monopoly rents and excessive hardware costs are actually the smallest part of the potential savings.[179] Far larger are a more rational product cycle,[180] reduced support costs associated with less frequent upgrades and reduced instability[181] and reduced crash time.[182] Although many of the savings are indirect, they are substantial, nonetheless.[183] If one is assessing the economic impact of the Microsoft monopoly on consumers, they must be considered.

V. Antitrust Lessons for the Internet Century

A. Competition in the New Economy and the Microsoft Remedy

The business case analysis in the previous section provides a useful transition to lessons for antitrust analysis in high technology

179. Consider the following example calculation. Assume 100 million units shipped at an average hardware cost of $750 and software costs of $250. Ferguson estimates bloated hardware costs at $100 per PC. FERGUSON, *supra* note 137, at 310. Earlier, we had identified software monopoly rents in the range of $80 to $125 per PC. Assume a total of $200 savings per PC.

Current costs = $1,000/PC x 100 million PCs = $100 billion
Competitive costs = $800/PC x 100 million PCs = 80 billion
Consumer Savings = 20 billion

180. Continuing the example above, assume a 25% reduction in the product cycle.

Competitive costs = $800/PC x 100 million PCs = $80 billion
25% reduction in product cycle = $800/PC x 75 Million PCs = 60 billion
Consumer Savings = 20 billion

181. Ferguson uses a rule of thumb of support costs, primarily associated with upgrades, of 3 to 5 times the acquisition costs. *Id.* at 311. Assume the mid-point of 4 times. Further assume that support costs decline in proportion to the slowing of the upgrade cycle (25%).

Support costs = 4 x $100 billion = $400 billion
25% reduction in support equal cycle = 300 billion
Consumer Savings = 100 billion

182. Ferguson does not offer an estimate of the value of reduced crash time, he points out that other products work much better. The value of savings would be immense. For example, surveys show that consumers endure over 5 hours per month of down time due to crashes. Even reducing this by two hours per month would be worth approximately $100 billion dollars. *Id.* at 311.

2 hr/month x 12 x 300 million base = 7.2 billion hrs
Valuing each hour at $14 per hour Savings = $100 billion

183. Thus, one can quickly arrive at savings in the range of $200 billion per year, when considering the impact of the Microsoft monopoly only on the operating system and the hardware costs it is driving. The U.S. accounts for half this both because of computer purchases and intensive use of computers. *See* U.S. DEP'T. OF COMMERCE, U.S. INDUS. & TRADE OUTLOOK, ch. 27-28 (2000). For example, the U.S. accounts for just under half of all computer systems and software purchases and almost 60% of all Internet traffic. *See id.*

industries. The "bundling/bolting" strategies represent competition between layers of the dominant platform. That is, a firm that is dominant in one layer (OS) can compete at another layer (CPU), but does not lose control over the layer it dominates. It is forced to squeeze out the rents from the other layer, but is satisfied with the defense of rents in its own layer. The possibility of competition across both layers exists. If full component competition were to break out, about twice as much rent could be squeezed out.

This is, of course, what Netscape/Java threatened to do to Microsoft. By attacking from the applications layer to the operating system layer, they threatened to "commoditize" the operating system. Commoditization is the consumers' best friend, since it drives the rents out of the industry.

For proof that it is sustainable in high tech industries, we need look no farther than to another layer of the platform, the hardware layer. Microsoft's strategic analysis gives us a graphic picture of the computer as a commodity, with constant price competition, pressures on margins, rising quality and compatibility.

The Department of Justice (DOJ) and the Attorneys General proposed, and the court adopted, a "functional" divestiture with a three year transitional period of extensive conduct oversight.[184] They propose to divide Microsoft into two roughly equal companies, each owning different types of software. The Operating Company would be built around the Windows operating system. The Applications Company would be built around Office, the Internet Explorer browser, and other applications. If the break-up is not ordered, the plaintiffs recommend that the conduct oversight remain in place for ten years. This approach is cautious, but appears to be a good compromise.

Breaking up Microsoft would unleash powerful competitive market forces in the industry and send a strong message that illegal business practices will not be tolerated. The functional breakup would not fragment the operating system. The transitional conduct remedies are intended to give the new incentives a chance to take root by re-igniting the competitive process in the industry. After a short transition, there would be no regulation of either of the new companies.

The remedy attacks the key element of market power that Microsoft executives repeatedly identified and used in their business

184. Plaintiffs' Proposed Final Judgment, United States v. Microsoft Corp., 87 F. Supp. 2d 30, 44 (D.D.C. 2000) (Nos. CIV.A. 98-1232, 98-1233).

plans and strategies to undermine competition. A functional divestiture would restore the natural competitive process in the software industry. Competition builds out from a strong customer base in a complementary product. That is the competitive dynamic that existed in the mid-1990s before Microsoft "cut off its air supply."

The DOJ remedy gave considerable weight to the layer concept. The DOJ remedy does not create immediate, new competition within either the operating system or the applications layer of the PC market, but the government experts argue that it would restore the competitive dynamics of the software market.[185] It would allow and encourage competition across the two software layers. Therefore, it would allow competition to grow in the way it was developing before Microsoft's vigorous campaign to preserve its monopoly in the mid-1990s.

If this remedy were imposed, the operating system monopoly could no longer provide a basis for the abuse of market power. The applications market would become much more competitive. At the same time, by not breaking up the operating system company into competing units, the potential problem of "fragmenting" the operating system (i.e., creating incompatible versions) would be avoided.

The Applications Company could not rely on the operating system monopoly to maximize its profits. It would have to find new revenues, like developing applications for non-Microsoft operating systems (e.g., Linux), or encroaching on the operating systems market by extending the functionality of its products to become "middleware" (i.e., replicating the browser threat). It would have to be more responsive to consumer demands—improving quality and decreasing price.

With more applications available, and interoperability expanding, non-Microsoft operating systems would become more viable competitors to Windows. This would lead to more competitive pressure on the Operating Company. It could not retaliate by threatening to withhold its product or raising its prices, as it has done in the past, lest competing operating systems become more attractive to computer manufacturers and software developers, who would have a real choice in PC operating systems for the first time in years.

185. Plaintiffs' Memorandum in Support of Proposed Final Judgment, Declaration of Paul Romer, Declaration of Carl Shapiro, Declaration of Rebecca Henderson, United States v. Microsoft Corp., 87 F. Supp. 2d 30, 44 (D.D.C. 2000) (Nos. CIV. A. 98-1232, 98-1233).

This economic process would take time, but experience in the software and other high tech industries suggests that real competition would produce many integrated, consumer-friendly operating systems that perform more reliably and better meet consumer needs. In a world of competing systems, compatibility would become a highly valued commodity and open standards would be developed. Competitive industries center on standards to which all companies can develop products. Non-dominant firms strive for enhanced compatibility. The court makes this very point in dismissing Microsoft's claim that it needed to require the installation of its browser to prevent fragmentation of the Windows platform.

In a sense, the court's acceptance of the remedy tailors the principles of antitrust to the new economy. It restores the competitive process of the industry that has been assaulted by anti-competitive conduct, which is consistent with fundamental antitrust principles.

The trial had shown that Microsoft has "monopoly power" and that Microsoft's conduct plainly amounts to "a substantial antitrust violation" (see Exhibit V-1). This extent of monopolization and its abuse reflects a structural problem, not merely a problem with unacceptable conduct. The key to the monopolization offense is, in fact, that the conduct preserved or reinforced a monopoly that otherwise would have been subject to competitive threats. Under these circumstances, the leading antitrust treatise explains the obligation of the court as follows: "[o]nce a firm found to have monopoly power has committed a substantial antitrust violation the optimal solution is to break up the monopoly and make the market more structurally competitive without losing efficiencies made possible by the monopolist's size and scope."[186]

The Supreme Court has long recognized that the effective remedy to the competitive problem of the abuse of monopoly power is to terminate the monopoly itself.[187] Professor Areeda observed that the simplest and surest remedy for illegal monopolization is "the restoration of competition through dissolution or dismemberment of the monopolist into two or more viable competing units."[188]

186. PHILLIP E. AREEDA & HERBERT HOVENKAMP, ANTITRUST LAW 207 (Supp. 1999).

187. *See e.g.*, United States v. Grinnell, 384 U.S. 563, 577 (1966) (holding that a decree should "break up or render impotent the monopoly power found to be in violation" of the antitrust laws).

188. AREEDA & HOVENKAMP, *supra* note 186.

The Supreme Court has provided clear criteria to evaluate appropriate relief for a monopolization violation.[189] Antitrust relief should "pry open to competition a market that has been closed by [a] defendant['s] illegal restraints."[190] This suggests that a remedy should not merely nibble around the edges of the monopolized market, but should kick-start competition by making sufficiently fundamental changes to allow competitors to rise or fall on their merits.[191]

The relief should "*terminate* the illegal monopoly."[192] The decree should prevent "*practices* likely to result in monopolization in the *future*."[193] The order should "*deny* to the defendant the *fruits* of its statutory violation."[194] There is little dispute that antitrust relief should avoid "transforming the district court into a regulatory agency."[195] A remedy that needs little ongoing supervision therefore is superior to one that needs extensive supervision.[196]

Identifying a set of conduct remedies that could be used to address the antitrust violation is a daunting task because so many anti-competitive aspects of Microsoft's behavior were demonstrated at trial, especially in light of Microsoft's past and ongoing behavior inside and outside of the courtroom. Having failed to convince the court that it did not do the crime, Microsoft set about trying to convince public opinion that it should not do the time. Outside of the courtroom it commissioned studies to suggest that a strong remedy would hurt the public. Relying on assumptions that have been refuted in court, Microsoft's defenders have generated huge estimates of disruption costs.[197] They assume that Microsoft has not exercised any market power in the past, but that the operating system company would start to do so after a break up. They assume the software

189. *See* Ford Motor Co. v. United States, 405 U.S. 562, 577-78 (1972).

190. *Id.*

191. *See* United States v. United Shoe Mach. Corp., 391 U.S. 244, 250 (1968).

192. *Id.* (emphasis added).

193. *Id.* (emphasis added).

194. *Id.* (emphasis added).

195. JTC Petroleum Co. v. Piasa Motor Fuels, Inc., 190 F.3d 775, 780 (7th Cir. 1999) (Posner, C.J.).

196. As the Supreme Court has observed, "the policing of an injunction would probably involve the courts and the Government in regulation of private affairs more deeply than the administration of a simple order of divestiture." United States v. DuPont & Co., 366 U.S. 316, 334 (1961); *see also* United States v. AT&T, 552 F. Supp. 131, 167-68 (1982).

197. *See* Stan J. Liebowitz, *Breaking Windows: Estimating the Cost of Breaking up Microsoft Windows*, ASS'N COMPETITIVE TECH AND THE ASCII GROUP, Apr. 30, 1999, at 10; Stan J. Liebowitz, *A Fool's Paradise: The Windows World After a Forced Breakup of Microsoft*, ASS'N COMPETITIVE TECH., Feb. 25, 2000, at 12; Liebowitz, *An Expensive Pig, supra* note 112, at 2-3.

market could not develop compatibility functionality to sustain head-to-head competition as we know it. These assumptions were discredited inside the courtroom during the trial and they are no less wrong outside the courtroom after the trial.

A conduct remedy would have to be extensive, since Microsoft has engaged in such a broad range of anti-competitive practices. The policing of the remedy would have to be aggressive, since Microsoft has shown itself to be recalcitrant both in its failure to comply with the earlier consent decree and in its steadfast denial of wrongdoing in this case. Even if Microsoft obeyed the decree, competition would be slow to take root because Microsoft has dominated the operating systems market for so long.

A comprehensive behavioral remedy would need specific provisions to address each of the anti-competitive practices that contributed to the violations of law and enforcement mechanisms that have a reasonable chance of eliciting compliance or discovering and rectifying non-compliance.

The transitional conduct remedies recommended by the court are intended to give the new incentives a chance to take root by re-igniting the competitive process in the industry. The conditions placed on Microsoft behaviors address each of the identified anti-competitive practices thoroughly.

(1) Under the Table

For certain anti-competitive practices, the Conclusions of Law stand as a remedy in themselves. The Conclusions of Law signal strongly that this conduct is not acceptable.[198] They may trigger private and class action lawsuits. These could deprive Microsoft of one of the most important fruits of its monopoly, the huge horde of cash on hand. Given the manner in which the federal case was conducted, that is the only way to get at the past fruits of monopoly conduct.

(2) Applications Barrier to Entry

Behavioral conditions, such as disclosure requirements and prohibitions on discrimination, must apply to the entire "Windows Family" and the applications built on it. They must also apply to all aspects of the interface between Microsoft and both distribution channels and other software vendors.

198. United States v. Microsoft Corp., 87 F. Supp. 2d 30 (D.D.C. 2000).

(3) Contracting

It goes without saying that exclusive arrangements should not be tolerated. However, the Court has recognized that preferential deals are a powerful tool to preserve the monopoly. A prohibition on discrimination should apply to prices, functionalities, support, testing, marketing, and other considerations that Microsoft has used to discriminate in the past.

(4) Quality Impairment

Porting of Office, disclosure of APIs and access to source code will all help diminish Microsoft's ability to impair the quality of competing or potentially competing products. A mechanism to ensure non-discriminatory access will be crucial. Microsoft should also be required to support older operating systems and to provide training on new operating systems.

(5) Bundling

Microsoft should be required to spin off the browser. This is the market that was monopolized and competition could yet be restored in it. It is also an important choke point for leveraging other Internet related markets. Other bundling issues will have to be referred to a special master. However, the Court has established a clear test. Where products can stand alone, they should be required to be offered for sale separately.

(6) Price

The conduct remedy will not place immediate downward pressure on operating system prices. Price discrimination can be eliminated with a requirement to publish a uniform pricing schedule. This will alleviate one major source of leverage over OEMs. The practice of raising the price on older versions when new ones come out should be banned. Older versions should also be supported for a period. Two-way compatibility should be maintained. This will alleviate the pressure to upgrade.

B. Antitrust Lessons Beyond the Case

While the economic literature recognizes that a large installed base may be necessary to promote economies of scale and positive network externalities, it also recognizes that large market shares sustained over long periods may be harmful. The "benefits" of having a firm that dominates an industry of this size and to this extent

are doubtful. The "winner-take-most" outcome is far less of an ironclad law than defenders of monopolies claim.[199] The claim that Schumpeterian monopoly is necessary for innovation has been challenged.[200] The empirical facts of the case also make it clear that there are other outcomes that are far more competitive and consumer-friendly.

(1) Structure

Economic theory recognizes the uncertainty of outcomes. A variety of stable market structures is possible. Technological "lock-in" may short-circuit the innovation process.[201] With the reinforcement of network effects, small advantages gained early in

199. Michael L. Katz and Carl Shapiro, *System Competition and Network Effects*, 8 J. ECON. PERSP. 93, 105-06 (1994) [hereinafter Katz & Shapiro, *System Competition*], argue that competition between incompatible systems is possible, depending on consumer heterogeneity. Paul Belleflamme, *Stable Coalition Structures with Open Membership and Asymmetric Firms*, 30 GAMES & ECON. BEHAV. 1, 1-3 (2000), and Berd Woeckener, *The Competition of User Networks: Ergodicity, Lock-ins, and Metastability*, 41 J. ECON. BEHAV. & ORG. 85, 86-87 (2000), reach a similar conclusion in a different theoretic framework. Timothy F. Bresnahan and Shane Greenstein, *Technological Competition and the Structure of the Computer Industry*, 47 J. INDUS. ECON. 1, 5-8 (1999), envision a great deal of competition within the layers of a platform and across layers in relatively short periods of time. The description of IBM's mainframe platform provided by Franklin M. Fisher, *The IBM and Microsoft Cases: What's the Difference*, 90 AM. ECON. REV., 180, 183 (1999), stresses both these points. *See also* Daniel L. Rubinfeld, *Antitrust Enforcement in Dynamic Network Industries*, 43 ANTITRUST BULL. 859, 873-75 (1998); Willow A. Sheremata, *New Issues in Competition Policy Raised by Information Technology Industries*, 43 ANTITRUST BULL. 547, 573-74 (1998) [hereinafter Sheremata, *New Issues in Competition*].

200. SCHERER & ROSS, *supra* note 15, at 660.

> Viewed in their entirety, the theory and evidence suggest a threshold concept of the most favorable climate for rapid technological change. A bit of monopoly power in the form of structural concentration is conducive to innovation, particularly *when advances in the relevant knowledge base occur slowly*. But very high concentration has a positive effect only in rare cases, and more often it is apt to retard progress by restricting the number of independent courses of initiative and by dampening firms' incentive to gain market position through accelerated R&D. Likewise, given the important role that technically *audacious newcomers* play in making radical innovations, it seems important that barriers to new entry be kept at modest level. Schumpeter was right in asserting that perfect competition has no title to being established as the model of dynamic efficiency. But his less cautious followers were wrong when they implied that powerful monopolies and tightly knit cartels had a strong claim to that title. What is needed for rapid technical progress is a subtle blend of competition and monopoly, with more emphasis in general on the former than the latter, and with the role of monopolistic elements diminishing when rich technological opportunities exist.

Id.

201. Sheremata, *Barriers to Innovation*, *supra* note 74, at 967.

the process turn into substantial leads in the marketplace.[202] The feedback process can lock in the wrong technology.[203] Once an inferior technology is "locked-in," superior technologies may be "locked-out."[204] High fixed costs and low variable costs may slow innovation.[205]

The potential for inefficiency and market failure may exist, even where positive network externalities exist. Consumer risk aversion may bias them toward known technologies.[206] A herd mentality makes it difficult for new technologies to enter the market.[207] This mentality tends to become a self-fulfilling prophecy.[208] On the supply side, sponsors and agents may play an "innocent" role in locking in the wrong technology by giving an advantage to a solution to one problem that unintentionally and inappropriately is applied to a different problem.[209] Because the inferior solution is given a head start, it takes hold.

One of the most important observations about the origins of a positive feedback process is its openness in the early stages of development.[210] In order to stimulate the complementary assets and supporting services, and to attract the necessary critical mass of customers, the technology must be open to adoption and development by both consumers and suppliers.[211] This openness captures the critical fact that demand and consumers are interrelated.[212] If the activities of firms begin to promote closed technologies,[213] this is a clear sign that motivation may have shifted.[214] While it is clear in the literature that the installed base is important, it

202. Robin Cowan, *Tortoises and Hares: Choice Among Technologies of Unknown Merit*, 101 ECON. J. 807, 808 (1991).

203. Dominique Foray, *The Dynamic Implications of Increasing Returns: Technological Change and Path Dependent Efficiency*, 15 INT'L J. INDUS. ORG. 733, 748-49 (1997); Schilling, *supra* note 41, at 268.

204. Joseph Farrel & Garth Saloner, *Standardization, Compatibility, and Innovation*, 16 RAND J. ECON. 70, 70-83 (1986).

205. *Id.*

206. Cowan, *supra* note 202, at 809.

207. *See* Yoffie, *supra* note 103, at 23.

208. Katz & Shapiro, *Antitrust and Software*, *supra* note 37, at 438-39.

209. Foray, *supra* note 203, at 745.

210. Yoffie, *supra* note 103, at 21; *see also* Bresnahan & Greenstein, *supra* note 199, at 36-37; Katz & Shapiro, *System Competition*, *supra* note 199, at 103.

211. Schilling, *supra* note 41, at 280-81.

212. Katz & Shapiro, *Antitrust in Software*, *supra* note 37, at 424.

213. *See generally, id.*; Jay Pil Choi, *Network Externalities, Compatibility Choice and Planned Obsolescence*, 42 J. INDUS. ECON. 167 (1994).

214. Robin Mansell, *Strategies for Maintaining Market Power in the Face of Rapidly Changing Technologies*, 31 J. ECON. ISSUES 969, 970 (1997).

is not clear that an installed base must be so large that a single firm can dominate the market. As long as platforms are open, the installed base can be fragmented and still be large.[215] In other words, a large market share is not synonymous with a large market.[216] A standard is not synonymous with a proprietary standard.[217] Open platforms and compatible products are identified as providing a basis for network effects that is at least as dynamic as closed, proprietary platforms[218] and much less prone to anti-competitive conduct.[219]

The installed base of computers is so large that it could support multiple and competing operating systems, software packages, and browsers that would be optimized to meet specific needs. Nor is there any reason to believe that the installed base will be fragmented in the sense that crossplatform applications and translations would not be available to those who value them. Microsoft's number one enemy was always compatibility that it could not control. No one ever threatened to fragment the base, what they threatened to do was migrate it to a platform that was broader and more inclusive than Microsoft's. The only threat was to Microsoft's monopoly control over the installed base.[220]

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215. Schilling, *supra* note 41, at 274.

216. Sheremata, *Barriers to Innovation*, *supra* note 74, at 965.

217. HAL VARIAN & KARL SHAPIRO, INFORMATION RULES (1999).

218. Bresnahan & Greenstein, *supra* note 199, at 36-37; Joseph Farrell & Michael L. Katz, *The Effect of Antitrust and Intellectual Property Law on Compatibility and Innovation*, 43 ANTITRUST BULL., 645, 650 (1998); Katz & Shapiro, *System Competition*, *supra* note 199, at 109-12; Carmen Matutes & Pierre Regibeau, *Mix and Match: Product Compatibility Without Network Externalities*, 19 RAND J. ECON. 221-233 (1988).

219. Mark A. Lemley & David McGowan, *Could Java Change Everything? The Competitive Propriety of a Proprietary Standard*, 43 ANTITRUST BULL. 715 (1998) [hereinafter Lemley & McGowan; *Could Java*]; Mark A. Lemley & David McGowan, *Legal Implications of Network Effects*, 86 CAL. L. REV. 479, 516-18 (1998) [hereinafter Lemley & McGowan, *Legal Implications*].

220. *Internet Tidal Wave*, *supra* note 64 (identifies cross and multi-platform applications as its fundamental challenge).

> Apple benefited by having TCP support before we did and is working hard to build a browser... from OpenDoc components. Apple will push for OpenDoc protocols to be used on the Internet, and is already offering good server configurations....
>
> Acrobat and quick time are popular on the network because they are cross platform and the readers are free....
>
> Netscape. Their browser.... They are pursuing a multi-platform strategy...
>
> Over time the shell and the browser will converge and support hierachical/listquery viewing as well as document with links viewing. The former is the structured approach and the later allows for richer presentation. We need to establish OLE protocols as the way rich documents are shared on the Internet. I am sure the OpenDoc consortium will try and block this.

Id.

The market outcome that most vigorously challenges the proprietary "winner-take-most" model is a model that centers on open standards.[221] Microsoft itself recognizes that the most important developments in computing in post mainframe environment are open standards, first the PC then the Internet.

> The Internet is the most important single development to come along since the IBM PC was introduced in 1981....
>
> The Internet's unique position arises from a number of elements. The TCP/IP protocols that define its transport level support distributed computing and scale incredibly well. The Internet Engineering Task Force (IETF) has defined an evolutionary path that will avoid it running into future problems even as virtually everyone on the planet connects up. The HTTP protocols that define HTML Web browsers are extremely simple and have allowed servers to handle incredible traffic reasonably well.[222]

Once the economic inevitability and superiority of a "winner-take-most" model is questioned, we confront the motivation to monopolize. In spite of theoretical claims that monopolists have little motivation to engage in such activities, there is ample evidence that these anti-competitive behaviors may be attractive to a new economy monopolist for a variety of reasons.[223]

- Market power in the core product can be preserved by conquering neighboring markets, raising cross-platform incompatibilities, raising rivals' costs, or preventing rivals from achieving economies of scale.
- Profits may be increased in the core product by enhanced abilities to price discriminate.
- By driving competitors out of neighboring markets, new monopolies may be created or the ability to preserve market power across generations may be enhanced by diminishing the pool of potential competitors.

221. Lemley & McGowan, *Could Java*, *supra* note 219; Lemley & McGowan, *Legal Implications*, *supra* note 219, at 515-23.

222. *Id.*

223. *See* Katz & Shapiro, *Antitrust in Software*, *supra* note 37, at 70-80; Lansuz A. Ordover and Robert D. Willig, *Access and Bundling in High Technology Markets*, *in* COMPETITION, INNOVATION AND THE MICROSOFT MONOPOLY: ANTITRUST AND THE DIGITAL MARKETPLACE 107-08 (Jeffrey A. Eisenbach & Thomas M. Lenard eds., 1999); Rubinfeld, *supra* note 199, at 877-81; Steven C. Salop, *Using Leverage to Preserve Monopoly*, *in* COMPETITION, INNOVATION AND THE MICROSOFT MONOPOLY: ANTITRUST AND THE DIGITAL MARKETPLACE 93-96 (Jeffrey A. Eisenbach & Thomas M. Lenard eds., 1999).

In the end, economic theory does not resolve the issue, empirical facts do. We look to the empirical facts, especially corporate motivation and conduct, organized in the traditional antitrust framework. In this case they are overwhelmingly on the side of traditional market structure analysis and the antitrust laws. Despite Microsoft's claims of a new competitive dynamic in these network, new economy industries, the traditional rules of antitrust remain a solid guide to pro-innovation, procompetitive, proconsumer public policy. The warning signs remain the same.

- At the level of structure, we include the traditional warning signs of large and persistent market shares, especially across generations of intraplatform technological change and domination of multiple products within layers of a platform.
- In the high tech realm, domination of different layers of a platform and steering of consumers to specific products across layers of a platform should be a special concern. The installed base of customers at one layer provides the base to compete across layers.

(2) Conduct

Conduct and its intent should remain a central concern of antitrust authorities, notwithstanding the claim that "winner-take-most" competition justifies all tactics to eliminate the competition. Economic theory notes that it is especially critical to recognize that the entrepreneur is not passive in the positive or negative aspects of the lock-in process.[224] Sponsors have a variety of tools to create economic and entry barriers that are counterproductive. What was once the establishment of an installed base now becomes defense of market dominance that reduces competition and reinforces the "lock-out" of competing technologies. Having gained a controlling position, firms may seek to implement isolating mechanisms.[225]

Diffusion agents or technology sponsors can use a wide range of actions to advance their technology.[226] Precisely because certain

224. *See* Towhidul Islam & Miel Mead, *The Diffusion of Successive Generations of a Technology: A More General Model*, 36 TECH. FORECASTING SOC. CHANGE 389 (1997); Christos Skiadas, *Innovation Diffusion Models Expressing Asymmetry and/or Positive or Negatively Influencing Forces*, TECH. FORECASTING SOC. CHANGE 316 (1986).

225. Richard Makadok, *Can First-Mover and Early Mover Advantages Be Sustained in an Industry with Low Barriers to Entry/Imitation?*, 19 STRATEGIC MGMT. J. 683, 685 (1996).

226. Ulrich Witt, *"Lock-in" vs. "Critical Masses"–Industrial Change Under Network Externalities*, 15 INT'L J. INDUS. ORG., 753, 768-69 (1997).

characteristics of the process lend themselves to intervention by "sponsors," there is ample room for self-interested action that furthers the private sponsor's interest at the expense of the public interest.[227] The public good aspect of efforts to achieve critical mass—to organize the switch to a new technology—cannot be assumed to outweigh the private motivation in such actions.[228] Thus, a critical step is to look at actual firm behavior.[229]

A dominant firm may create barriers to entry through exclusive deals,[230] retaliation against those who deal with competitors,[231] manipulation of standards and support for competing products,[232] strategies that freeze customers,[233] and the exercise of property rights through restrictive licensing[234] patents and copyrights.[235] These business strategies create inertia and prevent competitors from gaining market share. Companies can leverage their access to customers to reinforce their market dominance.[236] This access allows them to bundle complementary assets.[237]

It is well recognized that dominant firms tend to blur distinctions between markets with bundling and integration of functions, so it is particularly important to consider the points of interface or interconnection between markets since this is where market power can be leveraged.[238] Additional control points that may emerge in the gateway to e-commerce make the market power analysis particularly important.[239] Given the threat of lock-in and the advantages of being

227. *See* Joseph Farrell & Garth Saloner, *Installed Base and Compatibility: Innovation, Product Preannouncements and Predation*, 76 AM. ECON. REV. 940, 948-51 (1986).

228. *See* Michael Katz & Carl Shapiro, *Product Innovation with Network Externalities*, 40 J.INDUS. ECON. 55, 73 (1992).

229. Robin Mansell, *Strategies for Maintaining Market Power in the Face of Rapidly Changing Technologies*, 31 J. ECON. ISSUES 969, 970 (1997).

230. *See* Schilling, *supra* note 41, at 276.

231. *See* Sheremata, *New Issues in Competition, supra* note 199, at 560-61; Glenn A. Woroch et al., *Exclusionary Behavior in the Market for Operating System Software: The Case of Microsoft*, *in* OPENING NETWORKS TO COMPETITION: THE REGULATION OF PRICE AND ACCESS (David Gabel & David Weiman eds., 1997).

232. *See* Sheremata, *New Issues in Competition, supra* note 199, at 560; *see also* FERGUSON, *supra* note 137, at 307; Lemley & McGowan, *Could Java*, *supra* note 219, at 732.

233. *See* Farrel & Katz, *supra* note 218, at 643-45; Sheremata, *New Issues in Competition, supra* note 199, at 566.

234. Katz & Shapiro, *Antitrust and Software*, *supra* note 37, at 75.

235. Schilling, *supra* note 41, at 279.

236. Makadok, *supra* note 225, at 693.

237. Yoffie, *supra* note 103, at 26; *see also* Robert E. Dansby & Cecilia Conrad, *Commodity Bundling*, 74 AM. ECON. REV. 377 (1984).

238. Mansell, *supra* note 229, at 977.

239. *Id.* at 982-83.

a dominant firm, the second generation of discrimination may rely on much subtler forms of discrimination.[240] This second generation of discrimination is difficult to detect and root out.

Bundling, which may play a key role in creating the critical mass for positive externalities during the early period of adoption of a technology that provides the benefit of convenience for consumers throughout the product life cycle, can also play a role in exploiting customers.[241] When combined with market power, bundling results in overpricing of products in the aggregate.[242] The conclusion is strongest with monopoly bundling, as is the case with Microsoft's browser, but extends to other situations as well.[243]

- Traditional marketing practices that tie products and predatory pricing remain a concern.
- Classic practices, such as refusal to deal with complements or competitors, retaliation for dealing with competitors, price discrimination and rebating, and foreclosure of distribution for competitors are still a cause for concern.
- In the high tech environment, manipulation of standards to disadvantage competitors or withdrawal of support for complements or competitors and lock-in contracts for core products or complements, including long terms, minimum commitments, and "preannouncement" of features to freeze customers become new concerns.
- Conduct that closes standards or frustrates cross platform compatibility and competition are the most egregious offenses, since these destroy the most dynamic economies available.

(3) Performance

Performance of the industry must be considered in terms of price,[244] innovation (quality)[245] and competitive process.[246] The

240. *See* Lopatka & Page, *supra* note 34, at 363.

241. *See* Carmen Matutes and Pierre Regibeau, *Compatibility and Bundling of Complementary Goods in a Duopoly*, 50 J. INDUS. ECON. 46 (1992).

242. Joseph P. Guiltnan, *The Price Bundling of Services: A Normative Framework*, 51 J. MKTG. 74 (1987).

243. Lester Telser, *A Theory of Monopoly of Complementary Goods*, 52 J. BUS. 211-30 (1979); Richard Schmalensee, *Gaussian Demand and Commodity Bundling*, 57 J. BUS. 211-30.

244. *See* FERGUSON, *supra* note 137, at 308-09; Sheremata, *New Issues in Competition, supra* note 199, at 560.

245. *See* HEILEMAN, *supra* note 6, at 91-93. Sheremata, *New Issues in Competition, supra* note 199, at 566, argues "[h]owever, the fact that the monopolist has innovated is not

reward for successful anti-competitive activity is the ability to impose pricing patterns on the public that exploit market power and allow the dominant firm to control the direction and pace of innovation to protect its interest.[247]

The economic literature recognizes that the introduction of, and the reliance upon, price discrimination after the initial round of positive growth is a crucial factor. Price discrimination undermines the value of existing products by creating incompatibilities.[248] This extracts consumer surplus.[249] Price discrimination allows firms to manage the cannibalization process. That is, introducing later versions of a product does not eliminate the ability to extract consumer surplus, as long as price discrimination occurs.[250] Advertising and distribution will shift in nature from an open and expansive focus to a proprietary emphasis,[251] while control over the product cycle can impose immense costs through forced upgrades.[252] Indirect costs through greater and accelerated demands on hardware may actually be several times larger than the direct costs of hardware and software.[253]

- As we have shown, traditional concerns about high and rising prices remain pertinent. Monopoly rents provide the resources to execute anti-competitive strategies and these can be measured in terms of excess profits.
- In high tech industries, compulsory and coercive upgrading policies are a concern, as they exploit switching costs to extract consumer surplus.

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the most relevant point. Most relevant to social welfare is whether the monopolist innovated more than a set of competing firms would have."

246. *See* FERGUSON, *supra* note 137, at 311 (linking the lack of competition to slowing of innovation).

247. *See* Michael Katz & Carl Shapiro, *R&D Rivalry with Licensing or Imitation*, 77 AM. ECON. REV. 403, 411 (1987); Michael Waldman, *Planned Obsolescence and the R&D Decision*, 27 RAND J. ECON. 583, 590-92 (1996).

248. Choi, *supra* note 213, at 171-73.

249. *Id.* at 176-77.

250. K. Sridhar Moorthy, *Market Segmentation, Self Selection, and Product Lines Design*, 3 MKTG. SCI. 303 (1984); Marcel Thum, *Network Externalities, Technological Progress, and the Competition of Market Contracts*, 94 INT. J. INDUS. ORG. 280, 285-86 (1997).

251. John R. Hauser & Steven M. Shugani, *Defensive Marketing Strategies*, 2 MKTG. SCI. 319 (1983) (finding a basis to decrease awareness advertising, decrease distribution budget and increase price, late in the product cycle).

252. *See* Glenn Ellison & Drew Fudenberg, *The Neo-Luddite's Lament: Excessive Upgrades in the Software Industry*, 30 RAND J. ECON. 253, 272 (2000); Drew Fudenberg & Jean Tirole, *Upgrades, Trade-ins, and Buybacks*, 28 RAND J. ECON. 235, 236 (1998).

253. *See* FERGUSON, *supra* note 137, at 309-10.

- Measuring impacts on quality and innovation is the most difficult aspect of market performance to assess. Slowing of innovation through the delay or prevention of products is one area of concern. Sloppy design and reduced or unstable performance are additional concerns.
- Creation of and/or indifference to consumer inconvenience also emerge as a concern.

It would be reasonable for antitrust officials confronted with questions about anti-competitive practices in high technology industries to act only when they observe warning signs at *each* of the levels of analysis. The Microsoft case presents mountains of evidence of many violations at *every* level. In the end, this case is not about new, high technology industries. It is about old anti-competitive business practices that have been illegal for over a century.

C. Conclusion: The Consumer Lesson of the Microsoft Case

Perhaps the most important lesson that can be learned from the court's careful consideration of the multiple forms of harm is that consumers need not fear real competition in the software industry or the new economy. Can we expect a competitive market to be as efficient and "consumer friendly" as the Microsoft monopoly?

Given the fact that Microsoft has undermined successful products from profitable companies, there is every reason to believe that consumers would receive products that are better at lower prices if the anti-competitive practices were eliminated. The ability of developers to create products that are compatible, which Microsoft then drives out of the market with anti-competitive tactics, suggests that if Microsoft were prevented from abusing its market power, a competitive market would produce compatible products. Fears that competition will cause computing to become more difficult, requiring support of multiple, incompatible applications and operating systems, are unfounded. If the installed base of more than 300 million computers were divided between competitors, interoperability would be seen as a premium quality. OEMs could purchase and choose from a number of bundles and companies could profitably write programs to any of them. Portability will be highly valued in the market.

In fact, Microsoft has fought against software compatibility in market after market. Over time, as Microsoft's market share has grown, it has built more and more barriers to interoperability between Windows and other operating systems or application

software. Microsoft is not actually concerned about incompatibility when it controls that incompatibility and it suits its business interests. The threat to the public has grown with each subsequent conquest of a market.

The ultimate irony is that Microsoft's pricing and marketing pattern imposes the greatest burden on the very consumers that it claims to be helping most with its preinstallation and bundling of software.[254] The least sophisticated consumers are the most likely to take the packages and upgrades and least likely to find the alternatives that Microsoft has driven into niches in the market. These consumers cannot find bundles that suit their limited needs, so they are forced to "buy up" both in the initial purchase and with upgrades.

At its heart, the arguments against a break-up are essentially a defense of monopoly in the industry. The trial undermines the claim that the monopoly persists because of the unique natural forces of the software market. The causes of its durability are to be found in the plain old anti-competitive business practices of Microsoft. Real competition, even in this new economy industry, is not likely to impose the costs that its critics claim; it is likely to deliver the benefits consumers have come to expect from truly competitive markets. Thus, the lesson for consumers and antitrust policy makers to be drawn from the successful prosecution of the Microsoft case is clear—antitrust properly focused on competition should be a powerful form of consumer protection in the new economy, as it was in the old.

Just over a century ago, the antitrust laws were adopted and applied when America was taking leadership of the world's industrial economy. Break-ups of the major industrial corporations at that time were intended to prevent abuse and restore competition to the most important industries of the industrial age. Claims that preventing the concentration of economic resources would hurt the economy were raised at that time and they proved to be wrong, for exactly the same reasons they are wrong today. Competition is the wellspring of economic progress and technological innovation in our capitalist economy, and antitrust law still has a critical role to play in promoting and protecting competition.

The purpose of antitrust is not to pick or punish winners, it is to ensure that the contest is fair, because only a fair contest elicits effort that gets maximum progress. By any reasonable evaluation of Microsoft's behavior, it broke the rules. The Microsoft case

254. *Id.* at 310.

represents much more than good courtroom drama. It is the first antitrust test of the new economy and it will go a long way toward determining the role of antitrust in the Internet century. Importantly, the Microsoft case teaches that classic antitrust law and trial evidence still matter.

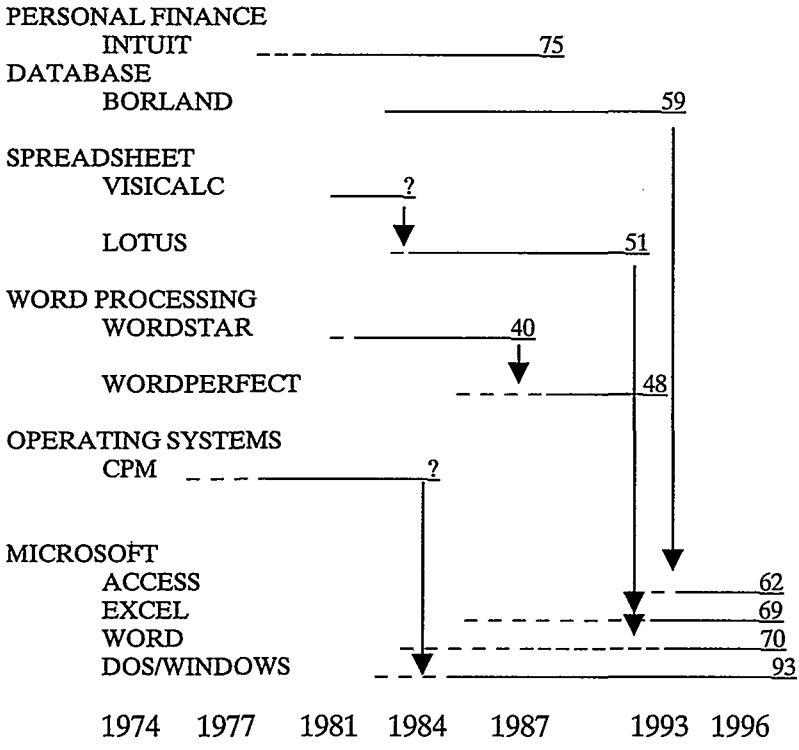
EXHIBIT I-1:

THE CASE AGAINST THE MICROSOFT MONOPOLY

	FACT (Paragraph No.)	LAW (Page No.)
MARKET STRUCUTURE		
MONOPOLY POSITION	18-21,33-35	4,5
BARRIERS TO ENTRY		
Hardware	19,20,22-27,54-55	4,6
Software	30,36-43,141,166	4,5,6
CONDUCT		
UNDER THE TABLE		
Abrogation Of Contracts	390,394	18
Intimidation	106,129,236,355	6,10
Market Division	88,105	10,22
Patent Infringement	390,394	
Reverse Bounty	139,260,2951	6,20
Predation	107,137-139,147	6,10,16,21,22
CONTRACT PROVISIONS		
Exclusive Deals	143,147,230-234, 247,259-260· 287-290,293-297,305-306,317-321, 326-326,332,337,339-340,350-352	10,15,37,38
Preferred Desktop Location	139,272,301	17, 20
Secret Price	64,118,236-238,324	6,10,11
Indirect Sales	10,19,103	4,6,10
Quality Impairment	90-92,128-129,160, 330,339-340	6,11
Resource Denial	240,357,379,396-406	31
Incompatibility/Integration	129,387-396,404-406	18,19
Disabling	160,170-172	11,31,32
Desupporting	90,122,128-129, 192,405-406	10,18
BUNDLING		
OS Tying	159, 170,198	4,11,12,31
Imitation	133-134,166	10,18,19,22
PERFORMANCE		
RETARDING INNOVATION		
Chilling Effect on Investment, Developer Time and Money	379, 397,412	
Delay or Prevent Development	411, 132,395-396	10,18,19
Netscape's Navigator	81-88,408-410	22
IBM's OS2/Smartsuite	116-118,125-130	10
Sun's JAVA	397-403	18
Real Networks	111-114	10
Apple's Quicktime	104-110	10
Intel's Native Signaling Processing	94-103	6
Undermining Compatibility	390-396, 407	6,18,19
DENIAL OF CONSUMER CHOICE		
Deny Products Consumer Needs	247, 410	
Delaying Release of Products	167-168	11
Deny Consumers User-Friendly	210-216	11
Force New Versions in New PC	57, 66	6
Deny or Delay Non-Microsoft	90-91,93	10,11

EXHIBIT III-1

MICROSOFT'S DOMINATION OF SOFTWARE CATEGORIES



NOTES: "- -" represents non-dominant years in market; "___ " represents dominant years in market.
SOURCE: Schmalensee, Direct Testimony, Table 2. Evans, Nichols and Reddy, *The Rise and Fall of Leaders in Personal Computer Software*

EXHIBIT III-2:
REALITY OF INSTALLED BASE OF OPERATING SYSTEMS

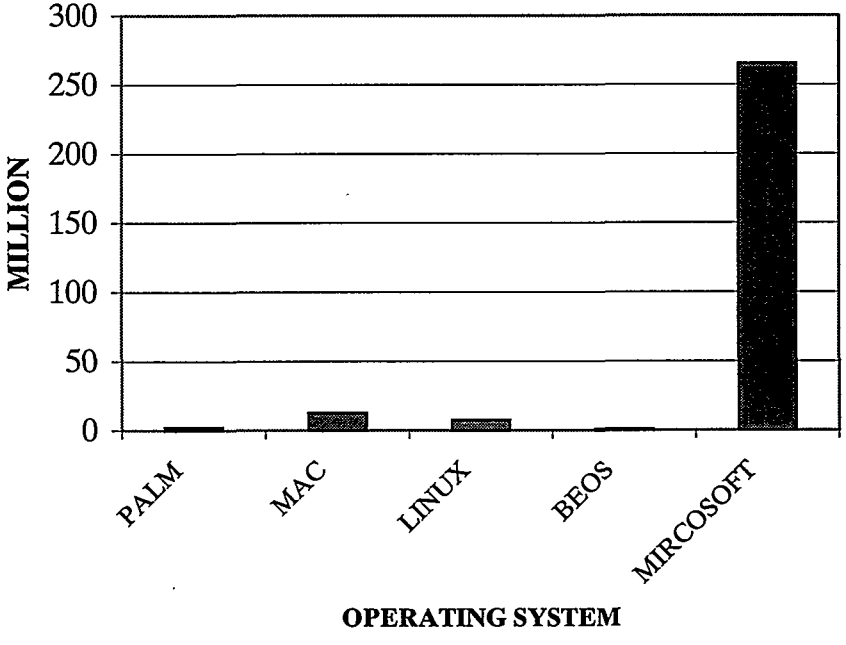


EXHIBIT IV-1:

OPERATING SYSTEM PRICES

	OEM	STREET[a]
1981[b]	$40	na
1990[c]	19	138
1996[c]	49	na
1998[d]	53	179

(a) Kenneth G. Elzinga & David E. Mills, PC SOFTWARE, Sept. 1998, at 51.
(b) David S. Evans et al., *The Rise and Fall of Leaders in Personal Computer Software*, NAT'L ECON. RESEARCH ASSOCIATES, Jan. 7, 1999, p. 4.
(c) Government Exhibit #365: Memorandum from Joachim Kempin to Bill Gates Dated Dec. 16, 1997, United States v. Microsoft, 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233).
(d) Bloomberg reports on sealed testimony in which Microsoft admits that it has ceased remitting to OEMs $4 per operating system for advertising costs. This results in an effective price increase to OEMs of $4 per system.

EXHIBIT IV-2:
IDENTIFYING MONOPOLY OVERCHARGES PRICE

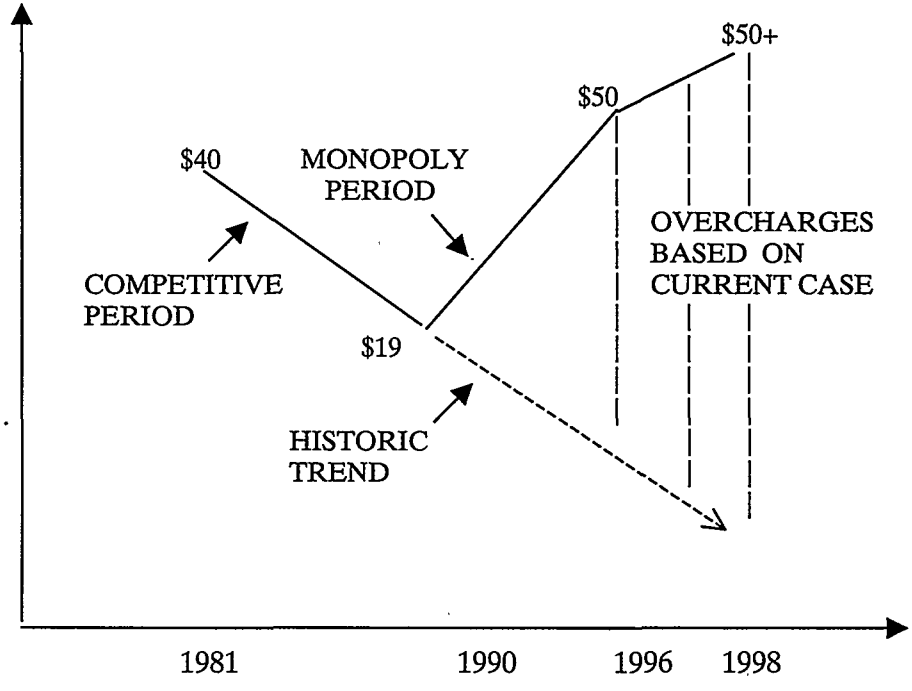


EXHIBIT IV-3:

PROFITABILITY OF THE COMPUTER INDUSTRY

	WINTEL		REMAINDER OF COMPUTER INDUSTRY				ALL
	MS	INTEL	SOFT	HARD	SEMI	ALL	INDUSTRY
RETURN ON EQUITY							
1996	32	36	18	14	17	14	17
1997	34	35	17	17	11	17	17
1998	29	28	14	14	0	12	16
1999	27	25	17	25	6	18	15
PROFIT MARGIN							
1996	26	25	6	6	3	5	6
1997	30	28	7	5	6	6	6
1998	38	23	5	4	1	4	6
1999	41	24	7	7	3	7	6

Source: BUS. WK., various issues.

EXHIBIT IV-4

THE EXTENT OF EXERCISE OF MONOPOLY PRICING POWER: ALTERNATIVE ASSUMPTIONS AND CONCLUSIONS

	Schmalensee (a)	Fisher (b)	EMPIRICAL (c) (d)		
Date for analysis	1997	1999	1996	1998	1998
CPU assumed	NA	NA	x86	High	Low
PC Price	$2000	$1000	$2000	$1500	$1000
Intel Role	None	None	Co-Monopolist		
Operating System/ CPU price	$50	$65	$286	$220	$100
Complementary Revenue	$100	$150	$150	$150	$150
Elasticity of Demand (d)	2	4	4	4	4
Profit Maximizing Monopoly Price	$1750	$98	$371	$227	$100
Actual Price as a % of Maximum Monopoly Price	3	66	77	97	100

(a) Report of Direct Testimony of Richard Schmalensee, United States v. Microsoft Corp., 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233).
(b) Rebuttal Testimony of Franklin Fisher taken on June 1 and 2, 1999, United States v. Microsoft, 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233).
(c) Government Exhibit #365: Memorandum from Joachim Kempin to Bill Gates Dated Dec. 16, 1997, United States v. Microsoft, 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233).
(d) Government Exhibit # 439: PC Value Analysis Cy 1990 – Cy 1996, March 4, 1996, United States v. Microsoft, 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233).

EXHIBIT IV-5

MICROSOFT'S STRATEGY FOR DEFENDING MONOPOLY PROFITS BY BUNDLING OPERATING SYSTEMS INTO CPU

	PRICE ESTIMATE	CONSUMER SAVINGS
Windows 2000 (W2k) Assuming Current Market Situation		
W2k (OS)	$ 100 - 120	
Intel CPU	170 - 180	
Total	$ 270 - 300	
BUNDLING/BOLTING COMPETITION		
Intel Bundles OS	200	70 - 100
or		
Microsoft Buys CPU & Bundles OS	170 - 175	100 - 125
FULL COMPONENT COMPETITION		
Competitive OS	20 - 30	80 - 90
Competitive CPU	70 - 75	100 - 105
Total	90 - 105	180 - 195

Source: Government Exhibit #365: Memorandum from Joachim Kempin to Bill Gates Dated Dec. 16, 1997, United States v. Microsoft, 84 F. Supp. 2d 9 (D.D.C. 1999) (Nos. CIV. A. 98-1232, 98-1233).

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